REGIONAL TRANSPORTATION PLAN

2015-2040

WASATCH FRONT REGIONAL COUNCIL

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OVERVIEW

INTRODUCTION

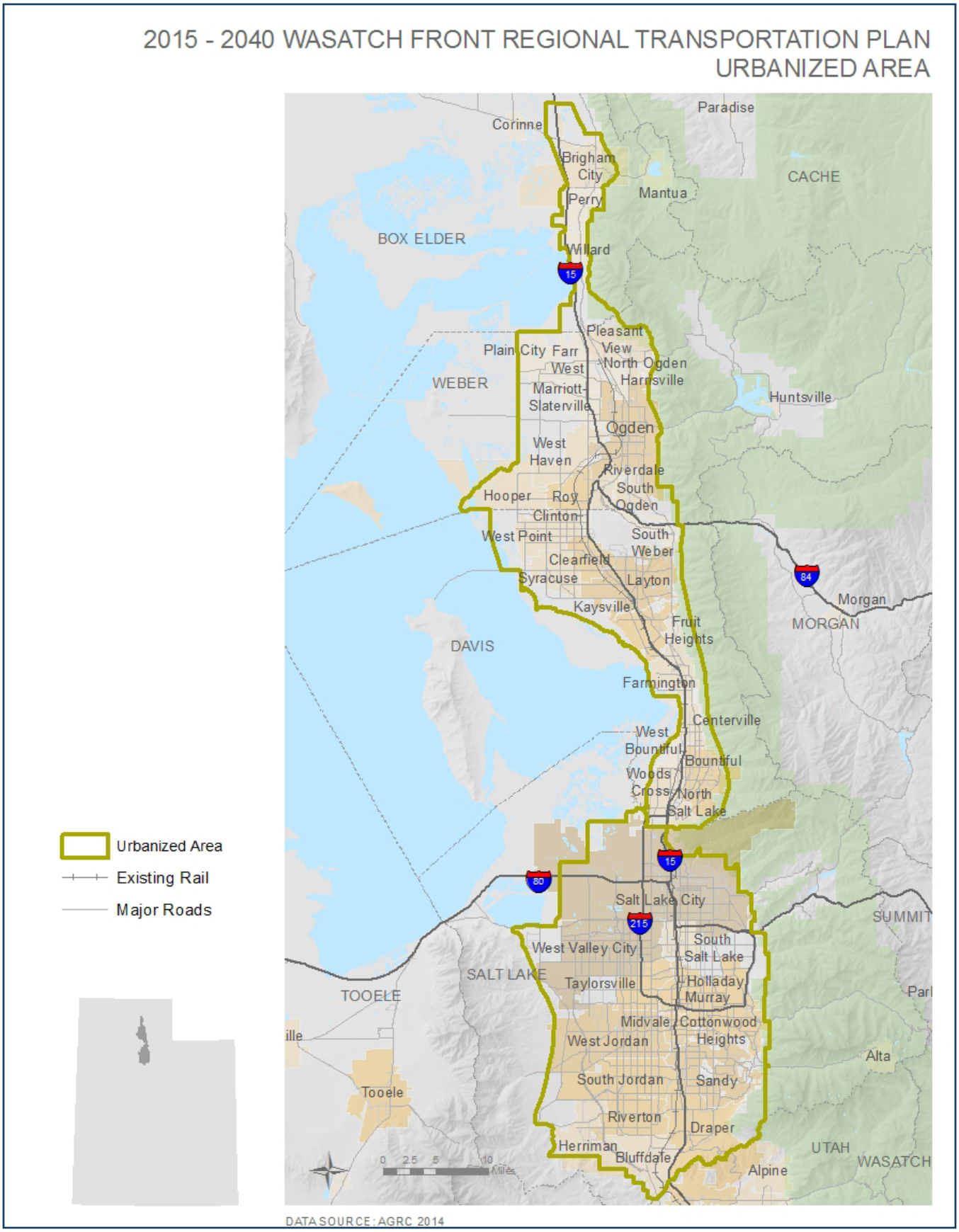
The Wasatch Front Regional Transportation Plan: 2015 – 2040 (RTP) has been developed to enhance the ability of our Region's transportation networks to meet the anticipated travel demand projected for the next 25 years. The 2015-2040 RTP provides programmed capacity improvements and specific recommendations for highway and transit facilities, pedestrian and bicycle paths, park-and ride lots, and airport and freight services for the Salt Lake –West Valley and Ogden- Layton Urbanized Areas. Based on the adopted regional land use and transportation vision, known as the Wasatch Choice For 2040 Vision (2040 Vision), the 2015 – 2040 RTP was developed in accordance with federal guidelines, is financially constrained, meets state requirements for air quality conformity, is scheduled to be updated every four years, and reflects a continuous effort by regional planners and engineers to identify and successfully meet existing and expected growth in travel demand throughout the Wasatch Front Region through the year 2040.

Formally created on May 27, 1970, the Wasatch Front Regional Council (WFRC) has been responsible for transportation planning in the Urbanized Areas of the Region since 1973. On December 26 of that year, Utah Governor Calvin L. Rampton designated the WFRC as a Metropolitan Planning Organization (MPO) responsible for developing area-wide long range transportation plans for Salt Lake, Davis, and Weber Counties.

Map 1-1, on page 3, shows the boundaries of the Metropolitan Planning Area, the Tooele Rural Planning Area, and the Salt Lake–West Valley and Ogden-Layton Urbanized Areas, all located within the Wasatch Front Region. The 2015 RTP was developed in cooperation with representatives from the Utah Department of Transportation (UDOT), the Utah Transit Authority (UTA), the Utah Division of Air Quality (DAQ), and the cities and counties throughout the region. The 2015 RTP meets federal government requirements (under Title 23, Part 450 and Title 49, Parts 100 to 300 of the Code for Federal Regulations) for metropolitan areas with a population of 50,000 or greater to develop and adopt a long range transportation plan with a minimum planning horizon of twenty years.

The planning policies and recommendations of the 2015 RTP have been prepared under the guidelines of the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), adopted by Congress on August 10, 2005. This document, Technical Report 51, details the 2015-2040 RTP planning process, lists new recommended capital improvement projects, provides for upgrades to the existing transportation facilities, and identifies both potential impacts and benefits of the 2015- 2040 RTP. This technical report supersedes its predecessor, entitled The Wasatch Front Regional Transportation Plan: 2011-2040, Technical Report 50.

MAP 1 - 1


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
URBANIZED AREA
Corinne
Brigham City
Perry
Willard
Mantua
Paradise
CACHE
BOX ELDER
WEBER
Plain City
Farr West
Pleasant View
North Ogden
Harrisville
Marriott-Slaterville
Huntsville
Ogden
West Haven
Riverdale
South Ogden
Hooper
Roy
Clinton
West Point
South Weber
Clearfield
Syracuse
Layton
Kaysville
Fruit Heights
Morgan
MORGAN
DAVIS
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
Salt Lake City
SUMMIT
West Valley City
South Salt Lake
SALT LAKE
Taylorsville
Holladay
Murray
TOOELE
Midvale
Cottonwood Heights
West Jordan
Alta
South Jordan
Sandy
Tooele
Riverton
Draper
Herriman
Bluffdale
Alpine
UTAH
WASATCH
Urbanized Area
Existing Rail
Major Roads
0 2.5 5 10 Miles
DATA SOURCE: AGRC 2014

OVERVIEW OF 2015 RTP PROCESS

Purpose for the 2040 RTP

Federal regulations governing the development of transportation plans and programs in urbanized areas require MPO's to update their regional transportation plans every four years. The Wasatch Front Regional Transportation Plan: 2015-2040 is based on the latest socioeconomic growth forecasts, projected increases in travel demand for the Region, and changes in the priority of various planned transportation improvement facilities. Periodic updates to the Wasatch Front's regional transportation plan allow for new information to be incorporated and recommended additions to the list of highway, transit, and other projects to be made. The 2015 - 2040 RTP specifies a coordinated system of highways, freeways, arterial streets, transit facilities, transit hubs, intermodal centers, park-and-ride lots, airport facility improvements, freight movement corridors, pedestrian paths, and bicycle routes. A 25-year planning horizon was selected for this latest effort. Thus, the 2015-2040 RTP covers the planning period from the year 2015 through 2040. The next planned update to the WFRC regional transportation plan is scheduled for 2019. Highways, freeways, arterial streets, transit facilities, transit hubs, intermodal centers, park-and-ride lots, airport facility improvements, freight movement corridors, pedestrian paths, and bicycle routes. A 25-year planning horizon was selected for this latest effort. Thus, the 2015-2040 RTP covers the planning period from the year 2015 through 2040. The next planned update to the WFRC regional transportation plan is scheduled for 2019.

Review of Planning Process

The Wasatch Front Regional Council utilized a 9-step planning process to guide the preparation of the 2015-2040 RTP. This process consists of: (1) Overview or Problem Identification; (2) Regional Visioning; (3) System Needs Assessment; (4) Alternatives Development And Evaluation; (5) Project Selection and Phasing; (6) Financial Plan; (7) Programmed Improvements; (8) Plan Impacts and Benefits; and (9) Plan Implementation.

This rather simple but effective model not only provides a straightforward approach to the complex task of planning for regional transportation growth and travel demand, but is also used as the format and chapter headings of this report. A series of four land use and transportation scenarios helped to compared different combinations of growth based on the Wasatch Choice for 2040 Vision and potential highway and transit projects. Realistic assumptions about funding sources and land development patterns over the next 25 years allowed the WFRC staff to project anticipated revenue streams needed to finance recommended transportation improvements. Finally, a quantifiable means of phasing both highway and transit projects, which took into account available funding for each phase, was implemented. Specific capacity improvement projects were placed into one of three construction and funding phases, or a fourth "unfunded phase" according to their overall evaluation. The planning steps in the 2015- 2040 RTP are detailed in **Figure 1-1**.

Public and Agency Involvement

The 2015-2040 RTP planning process started with a series of meetings with planners and engineers from UDOT and UTA, who helped identify areas of concern and suggestions for specific transportation facility improvements. The information provided by these professionals was compiled and analyzed. Additional meetings were scheduled with local elected officials, and representatives from UDOT, UTA, and many local, state, and federal agencies, including natural resource agencies. An extensive public outreach effort was designed and conducted to solicit and identify regional transportation issues, needs, and concerns from the point of view of the general public and other special interest and environmental justice groups. Additional input was provided by members of both the Salt Lake – West Valley and Ogden – Layton Technical Advisory Committees of the Regional Growth Committee.

Throughout the planning process, the Regional Growth Committee and the Wasatch Front Regional Council provided needed guidance and direction.

Regional Vision And Growth Principles

As part of the 2015 – 2040 RTP process, an updated regional land use and transportation vision, known as "Wasatch Choice for 2040," helped further define and clarify how the Region's Growth Principles translate into mixed use corridors, transit oriented developments, and higher density centers. This Regional Vision is an attempt to ensure that the billions of dollars programmed for transportation improvements over the next three decades will directly support and sustain planned land uses. The type of growth patterns and planned transportation investments must be coordinated to create a desired future along the Wasatch Front. The adoption of the 2040 Vision, along with its supporting Growth Principles, provides a framework for key transportation decisions and the revised 2040 Vision map will help guide transportation improvements and land use decisions designed to improve the Region's quality of life.

FIGURE 1 -1 2015 – 2040 RTP PLANNING PROCESS

Socioeconomic Projections

Utilizing population information received from the Governor's Office of Planning and Budget (GOPB), and the Envision Tomorrow Plus (ET+) program as an analytical tool, the WFRC generated population and employment projections for 1,686 traffic zones throughout the Wasatch Front Region. These projections distributed population and employment on the basis of the adopted Wasatch Choice for 2040 transportation and land use Vision. The Wasatch Front Region's socioeconomic projections were reviewed by community planners, engineers, and locally elected officials, allowing for adjustments to be made in this important input to the 2015 – 2040 RTP process. Population projections indicate that the Wasatch Front Region will increase over the next 26 years from approximately 1,700,000 persons to 2,300,000 persons.

Transportation Needs Analysis

Regional traffic modeling, utilizing projected 2040 population, employment, and transportation mode choice information, was generated and analyzed. Projected traffic volume and highway capacity ratios were mapped, allowing the WFRC to identify areas of potential concern. Information was also gathered on the Wasatch Region's pedestrian safety and vehicle accident rates. Additional needs analysis steps included an inventory of UTA bus and light rail service areas, ridership, operational frequency, transit park-and-ride locations, and other facilities. The chapter titled Assess Needs, details the analysis performed.

Strategy Development

The 2015 – 2040 RTP process utilized several regional land use inventory and environmental databases, including Utah's Planning Environmental Linkages (UPEL), developed by BioWest, and UDOT's UPLAN inventories. These databases were helpful in the preparation and analysis of system-wide alternative transportation solutions. Four alternative land use and transportation scenarios, were developed and evaluated by WFRC staff members, local planners and engineers, and UDOT and UTA representatives. Each alternative was based on a different combination of possible growth patterns within urban centers, as defined by the Wasatch Choice for 2040 Vision and transportation facilities. These four scenarios were reviewed and refined by local community planners and engineers, elected officials, and the general public.

FEDERAL PLANNING REGULATIONS

The United States Congress, through the Moving Ahead for Progress in the 21st Century Act (MAP-21), passed on June 6, 2012, identified eight planning factors for consideration in the development of regional transportation plans. MAP-21 also identifies planning strategies, goals, and responsibilities to guide the MPO. Under MAP-21, Metropolitan Planning Organizations are to develop transportation plans and programs in cooperation with the state and public transportation operators through a multi-modal, performance-driven, outcome-based approach to planning. The process is to be continuous, cooperative, and comprehensive. It must engage the public, address at least a 20-year planning horizon, be financially constrained, and be updated at least every four years.

The plans and programs adopted by MPOs provide for the development and the integrated management of regional transportation systems which are coordinated with the National Highway System and local transit facilities. The manner in which the 2015 – 2040 RTP addresses each of the eight MAP-21 planning factors can be found in the chapter titled Plan Impacts and Benefits of this document. The MAP-21 planning factors are listed below.

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
2. Increase the safety of the transportation system for motorized and non-motorized users.
3. Increase security of the transportation system for motorized and non-motorized users.
4. Increase the accessibility and mobility of people and freight.
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
7. Promote efficient system management and operations.
8. Emphasize the preservation of the existing transportation system.

TRANSPORTATION MODELING AND ANALYSIS TOOLS

The Wasatch Front Regional Council and the Mountainland Association of Governments Travel Demand Model (Travel Model) is a tool for analyzing integrated land-use, transportation, and air quality factors. The travel model estimates the travel patterns of people, based on their demographic characteristics, where they reside and are employed, and transportation facilities available to them. The travel model forecasts where people are likely to travel and by what mode, such as single occupancy autos, local bus, light rail, etc., people are likely to use. It assigns these trips to the travel mode that represents the best route for each particular trip. Travel model output is used to evaluate transportation corridors where future travel demand is likely to exceed the capacity of the facilities in the corridor, to identify and assess projects that meet travel demand, and to analyze air quality impacts of the transportation system.

The model includes several advanced features including improved modeling methodology needed to meet the requirements of MAP-21 and the Clean Air Act Amendments of 1990. In addition, several features recommended by the Travel Model Improvement Program (TMIP) of the US Department of Transportation, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Environmental Protection Agency (EPA) are incorporated into the model. The WFRC uses the model to perform comprehensive regional transportation analyses, and to evaluate various transportation and traffic impacts. Some of the most useful model outputs include: origin-destination flows, directional link vehicle volumes, vehicular travel times and speeds, and transit ridership estimates.

The target area considered by the model includes all of the developable portions of Utah, Salt Lake, Davis and Weber Counties. They do not consider the canyons and the mountains to the east of the urbanized areas. The model is calibrated to reasonably represent 2011 "base year" travel conditions and patterns, a process in which model output is checked or "validated" against hard data. Trip rates, transit ridership and highway volumes are examples of the types of model outputs that are validated. When the model results do not match the base-year values within an acceptable tolerance, parameters are adjusted until the model is acceptable. For future forecast years, the model output is reviewed for "reasonableness" to validate model results and model sensitivities.

The WFRC maintains a Travel Demand Model (TDM) which forecasts travel demand. The user can input different socio-economic assumptions, as well as test a variety of transportation scenarios. The socio-economic assumptions which were used to model the four scenarios were derived from the ET+ scenarios. The transportation networks used in the model were derived from the scenario planning process, which iterated between the impacts that the transportation system and land use patterns had on each other.

The TDM is updated on approximately a four-year cycle. Each update results in a new version of the model. Version 7 was used for the scenario planning process. A beta version of Version 8 was used for analyzing the phasing of the plan and for subsequent RTP-related modeling, so there may be some inconsistencies when comparing metrics from the final plan to the scenarios. All of the TDM related metrics included in this section were derived using Version 7 of the model. A detailed explanation of the WFRC's transportation modeling process and analytical tools can be found in Appendix A, entitled "Transportation Modeling and Analysis Tools."

GENERAL AREA CHARACTERISTICS

Geography

The Wasatch Front Urban Area is located in northern Utah and is comprised of the Salt Lake City and Ogden-Layton Urbanized Areas, which encompass the developed portions of Salt Lake, Davis and Weber Counties. In general, the area is bounded by the Great Salt Lake and the Oquirrh Mountains on the west, the Wasatch Mountains on the east, Utah County on the south and Box Elder County on the north. The geographic features which bound the area on the east and west create a natural growth boundary. The area has a general linear configuration, being over 60 miles from north to south, while only 20 miles east to west at the widest point.

Environment

The Wasatch Front Region's physical environment will affect the type and location of future development, and the transportation system constructed to serve development. The area is situated in a unique environment that presents both opportunities and potential problems for the region.

The Great Salt Lake is the dominant water feature in the area. Depending on the time of year and the drought

cycle, the lake covers an average of 2,300 square miles in size. It is relatively shallow with maximum depths of not much greater than 20 feet. Variations in precipitation affect the stream flows and groundwater levels, and thus cause the Lake to fluctuate dramatically in water level and area of coverage. The federal government, the State of Utah, and local governmental jurisdictions recognize that the Great Salt Lake has reached the flood stage when the water level is at an elevation of 4,217 feet. Hence development is restricted to the area above this level.

The Great Salt Lake

The greatest and most significant complex of wetlands in the intermountain area can be found adjacent to and surrounding the Great Salt Lake and along the Jordan River. These wetlands provide important marshland habitat to resident wildlife and internationally significant habitat for part of the year to possibly as many as one million migratory shorebirds and waterfowl that make annual migrations across North America. A majority of these wetlands are found on the east side of the lake, where most of the fresh water is received from the streams and river flowing form the Wasatch Mountains.

The steep slopes of the Wasatch Mountain Range were created by the Wasatch Fault, which runs the entire length of the Urbanized Area. The Wasatch Fault and other nearby faults highlight the potential for earthquakes in the area and the need to consider their possible impact on transportation facilities.

OVERVIEW OF REGIONAL SOCIOECONOMICS

Population

The first permanent Anglo settlers in the Wasatch Region arrived in the Salt Lake Valley in 1847. They soon began settling other parts of the region. In the 1850 Census, the population of Davis, Salt Lake, and Weber Counties was 8,471 or 75 percent of the state total. According to the 2010 Census, the combined population had increased to 1,576,370 persons, but the share had dropped to 57 percent of the state total. The Utah State Governor's Office of Management and Budget (GOMB) predicts the population of the Wasatch Front Region to grow to 2.3 million by 2040, with the share dropping even further, to 51 percent of the state total. Much of the growth is projected to occur in western Salt Lake County, northern Davis County, and western Weber County. Even with most of the projected growth in these areas, there will be significant infill and redevelopment in the currently urbanized areas. **Map 1-2** on the following page shows the projected population densities in the Wasatch Front Region in 2040. Land supply in Salt Lake and Davis Counties may also come into play in this planning horizon, as these two counties may approach "build-out" population during this time frame.

Employment

In the past, the regional economy was heavily dependent on a limited number of industrial sectors, particularly mining (Kennecott Utah Copper Corporation), government (Internal Revenue Service), and military (Hill Air Force Base). In the past 30 years, the Region's economy has diversified- no longer so dependent on mineral extraction and the military sectors, the economy is now based on the service sector with major activities such as health care, education, and local government. Agricultural industries continue to decline in importance at the regional scale. **Map 1-3** graphically displays anticipated employment densities in the Wasatch Front Region by 2040

New commercial development is projected in South Jordan City, Riverton City, Sandy City, Tooele County, and along the I-15 corridor. Additionally, dispersed areas of significant commercial activity have developed, such as the Fort Union area, Cottonwood Corporate Center, and Jordan Landing in the Salt Lake Valley. Smaller pockets of neighborhood scale commercial development are emerging throughout the Wasatch Region and, with

minor accommodations, could make neighborhoods more pedestrian-friendly. Large employment centers, such as Hill AFB, University of Utah, Salt Lake City International Airport, and downtown central business districts will need to be served with an appropriate transportation system. The distribution of commercial and industrial development will remain much as it is today. Detailed Population and Employment forecasts can be found in Appendix B, entitled "Socioeconomic Forecasts."

SUMMARY OF PUBLIC INVOLVEMENT EFFORTS

For the 2015 – 2040 update to the Regional Transportation Plan, the Wasatch Front Regional Council engaged in a pro-active public involvement and outreach program including the maintenance of a modern, interactive website, a list of 3,212 stakeholders who are sent invitations and updates on transportation issues, sponsorship of the annual Wasatch Choice for 2040 Consortium meeting at the Salt Palace (all of which had in excess of 350 attendees), regular news media contact, public open houses, small area meetings for area elected officials and staff, individual outreach to numerous environmental justice organizations and participation in numerous other studies and committees.

The WFRC solicited public participation and integrated oral and written comments received into the development of the four alternative land use and transportation scenarios, the draft 2015 – 2040 RTP, and the final adopted 2015 – 2040 RTP. Input for the 2015 – 2040 RTP was sought from various groups including freight hauling organizations, Transit Workers Union, Native American groups, advocates for people with limited incomes, minority organizations, senior citizens groups, community councils, city councils, local councils of governments, other government agencies (especially natural resource agencies), environmental groups, disabled rights advocates, chambers of commerce, state legislators, the Utah Congressional Delegation, and the general public. The WFRC considered comments received from these groups and individuals in the scoping, alternatives, draft and final document phase of Plan development. A summary of the public review process and a record of public involvement in the 2015 – 2040 RTP can be found in Appendix C, entitled "Public Involvement And Comment Summary."

Special Interest Outreach

WFRC staff members made dozens of visits to private citizens and environmental justice groups, and other organizations in order to identify transportation related problems and issues, receive input on possible solutions to growing travel demand, seek input to use in developing four alternative land use and transportation scenarios, and to solicit general comment on the draft 2015 – 2040 RTP document. This was done in the scoping, alternatives and draft phases of RTP development. Also, notification was made on the WFRC website that materials in Spanish are available upon request. Lastly, notice of open houses and other events were published in the local Spanish language newspapers.

Visioning Process

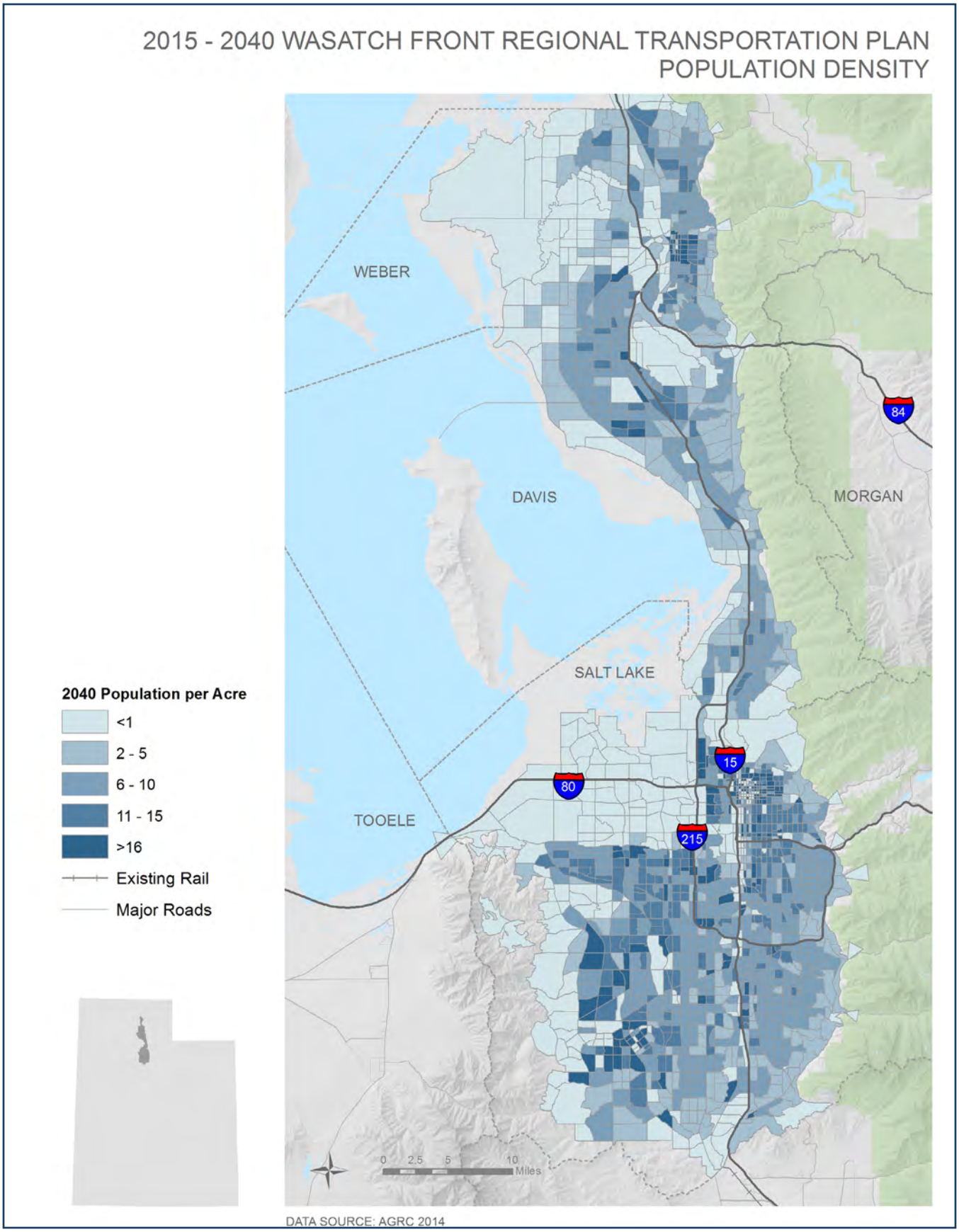
In 2005, the WFRC, in partnership with the Mountainland Association of Governments and Envision Utah, engaged the public in an 18 month visioning process to establish Wasatch Choices 2040 – A Four County Land-Use and Transportation Vision. This was an extensive process with thirteen workshops, four open houses and over 1,000 participants from all parts of the greater community and relevant government agencies. The result of the process was a set of nine Growth Principles derived by consensus and adopted by the Wasatch Font Regional Council and most of its member entities. These Growth Principles continued to guide the development of the 2015 – 2040 RTP and are an excellent example of how the public involvement process influences policy. The Regional Council staff has now made it a point in all 2015 – 2040 RTP presentations that the Wasatch Choice for 2040 Vision is the foundation of all regional transportation planning.

Small Area Meetings

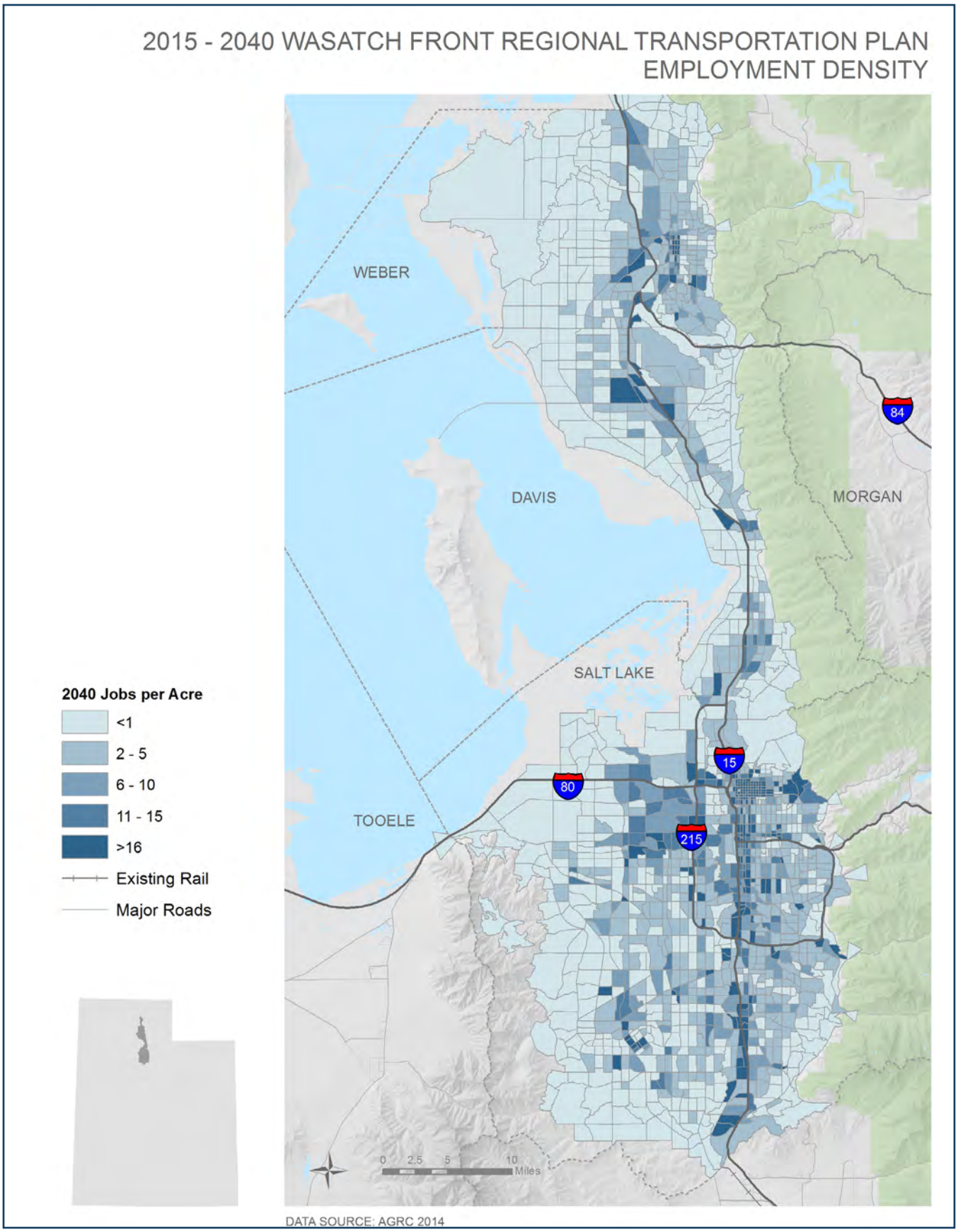
For the current update to the 2015 – 2040 RTP, the Regional Council reviewed the 2040 Vision with local elected officials and city planners in a series of small area meetings. In the first of these small area meetings attendees indicated where and how the 2040 Vision was being implemented on a local level and to what degree they foresaw additional development based on the Vision. This information helped guide specific project choices made by WFRC planners for the 2015 – 2040 RTP.

In the second series of small area meetings, Regional Council staff members presented the draft financially unconstrained 2015 – 2040 RTP to area mayors, other elected officials, and city and county staff members. There were numerous comments made which assisted and influenced the WFRC staff in prioritizing proposed transportation projects in the RTP.

MAP 1 - 2


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
POPULATION DENSITY
WEBER
DAVIS
MORGAN
SALT LAKE
TOOELE
84
15
80
215
2040 Population per Acre
<1
2 - 5
6 - 10
11 - 15
>16
Existing Rail
Major Roads
0 2.5 5 10
Miles
DATA SOURCE: AGRC 2014

MAP 1 - 3


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
EMPLOYMENT DENSITY
WEBER
DAVIS
MORGAN
SALT LAKE
TOOELE
84
15
80
215
2040 Jobs per Acre
<1
2 - 5
6 - 10
11 - 15
>16
Existing Rail
Major Roads
0 2.5 5 10
Miles
DATA SOURCE: AGRC 2014

The third and final series of small area meetings presented the draft, financially constrained and phased plan to area elected officials and city and county planning staff. There were some small changes made as a result of the comments received during these meetings. However, most issues of concern to these local leaders had already been resolved in previous small area meetings, thus minimizing the need for any large changes to the draft 2015 – 2040 RTP.

Public Open Houses

Three series of open houses regarding the 2015 – 2040 RTP were held in Salt Lake, Davis and Weber Counties. The first series of these meetings helped identify the region's transportation needs and were held in October 2012. The second series was held for the Alternatives Phase in July/August 2013 and the third for the draft 2015 – 2040 RTP were held in January/February 2015. All public open houses were announced through notices and advertisements in local newspapers including those in the Spanish language. Many local newspapers also ran news articles announcing the open houses and some ran articles on the open houses themselves. Also, approximately 3,000 e-mails were sent to interested stakeholders on the WFRC mailing list who received electronic notice of the upcoming open houses with an invitation to attend, along with notice on the WFRC website.

The public open houses served as a forum to receive input and to gauge public opinion concerning the 2015 – 2040 RTP and its underlying planning process. All comments from the open houses and other sources were summarized and responded to by the WFRC staff. The WFRC staff carefully considered and compiled written comments and summarized verbal comments received from the public after each open house. They then prepared a written response to each concern. All comments were made available to the members of the Regional Council and the public at large. A general summary of comments received was also made available.

Electronic Communication

All 2015 – 2040 RTP documents, comments, responses, and maps were made available on the WFRC website. Interested parties were invited to visit the website, review the documents posted there, and comment as desired. In addition, meeting packets for the Regional Growth Committee and the Regional Council were sent electronically. These same packets were made available to the members of the public. Lastly, thousands of e-mails and newsletters were sent out soliciting public review and comment.

Media Relations

Regular efforts to include the news media in WFRC meetings resulted in many news articles about Regional Council planning efforts. This was made possible because the WFRC cultivates and enjoys generally good relations with area news reporters. The Regional Council and the WFRC staff members were quoted at length in numerous newspaper and magazine articles and radio and TV interviews during the RTP development process. Lastly, personal visits were made to the area Spanish language newspaper to introduce the Regional Council and the draft 2015 – 2040 RTP.

Formal Public Comment Periods

In January and February 2015, the WFRC staff prepared the draft supporting document, entitled The Wasatch Regional Transportation Plan: 2015 – 2040 for distribution to interested public agencies, elected officials, local communities and the general public. A formal public review period was held during January/February 2015. Interested persons and groups were invited to review and offer comments on the draft 2015 – 2040 RTP in either formalized public open houses or individually at their convenience. Based on comments received from the first formal comment period and certain changes made in the draft document, it was decided that a second formal comment period was desired. The second comment period was held in April and May 2015. All comments from the first and second comment periods were reviewed by the WFRC staff. A summary of the comments, along with a WFRC staff response for each, was prepared and presented to the Wasatch Front Regional Council in May 2015.

The final document was reviewed and approved by the Wasatch Front Regional Council in May 2015. An electronic copy of the final adopted version of the 2015 – 2040 RTP is available on the WFRC website (www.wfrc.org).

PLANNING ORGANIZATIONS AND COMMITTEES

The development of the 2015 – 2040 RTP required the involvement, cooperation and coordination of various federal, state, local, and public organizations and committees. The WFRC worked closely with a number of agencies and organizations to ensure that the 2015

– 2040 RTP serves the needs and values of the region for which it is developed. The 2015 – 2040 RTP planning process utilized input and recommendations from the following groups:

Federal Agencies

- Federal Highway Administration
- Federal Transit Administration
- Federal Aviation Administration
- U.S. Environmental Protection Agency
- U.S. Army Corp of Engineers
- U.S. Bureau of Land Management
- U.S. Fish & Wildlife Service
- U.S. Forest Service

State Agencies and Organizations

- Utah Department of Transportation
- Utah Division of Air Quality
- Utah Division of Parks & Recreation
- Utah Division of State Lands, Fire, and Forestry
- Utah State Historic Preservation Office
- Utah State Department of Natural Resources
- Governor's Office of Planning and Budget
- Governor's Office of Economic Development

Local Governments

- Wasatch Front Regional Council
- Regional Growth Committee
- Transportation Coordination Committee
- Utah Transit Authority
- Salt Lake County Council of Governments
- Davis County Council of Governments
- Weber Area Council of Governments
- Salt Lake Area Transportation Technical Advisory Committees
- Ogden- Layton Area Transportation Technical Advisory Committees
- Municipal and County Planners and Engineers
- Local school and water districts

Environmental Justice Groups

- Coalition de La Raza
- NAACP
- Disability Rights Action Coalition
- Disability Law Center
- Salt Lake City Accessibility Services Council
- Indian Walk-In Center
- Salt Lake Community Action Program
- Ogden-Weber Community Action Program
- Weber Area Association of Human Service Organizations
- Davis County Coalition Against Domestic Violence
- Regional Coordinating Council (for the transportation disadvantaged)
- Senior Citizen Concerns / Willowood Senior Housing
- Utah Indian Housing Council
- Salt Lake Area Authority on Aging
- League of Women Voters
- Utahns for Better Transportation (a coalition of environmental groups)

Other Organizations

- Envision Utah
- Transit Workers Union
- General Public Open Houses
- University of Utah City and Metropolitan Planning Department
- Kennecott Lands
- Property Reserve, Incorporated
- Suburban Land Reserve, Incorporated
- Farmland Reserve, Incorporated
- Urban Land Institute
- FFKR Architects
- Survey of Mobility Needs for Transportation Disadvantaged (900 respondents)

Natural Resource Agencies

In addition to the above organizations, the WFRC presented the financially unconstrained draft of the 2015 – 2040 RTP to the Utah State Resource Development Coordination Committee, which is an association of federal and state environmental and natural resource agencies on May 8, 2014. Agencies participating in the Committee include the Utah State Department of Natural Resources, the Utah Public Lands Policy Coordination Office, Utah State Lands and Forestry, Utah State Parks, Utah Division of Wildlife Resources, U.S. Forest Service, U.S. Fish and Wildlife, and the U.S. Bureau of Land Management. A separate meeting for local and regional water agencies was held on April 17, 2014. These natural resource agencies provided early identification of key concerns, mitigation strategies, and solution development for project included in the draft 2015 – 2040 RTP.

Other groups included in the Regional Council's outreach program included presentations to various committees of the Utah State Legislature, chambers of commerce, real estate groups, community councils, urban planning groups, university classes, multiple open houses sponsored by the WFRC and other transportation agencies for members of the general public.

Finally, the WFRC was assisted in developing the 2015 – 2040 RTP by its two Regional Growth Committee (RGC)

Technical Advisory Committees (TAC), whose membership is made-up of the Wasatch Front Region's municipal and county planners. The Wasatch Front's Regional Growth Committee (RGC) and the Transportation Coordination Committee (Trans Com), each with its respective TACs, were key participants in the RTP process. Timely input from the TACs helped to guide the 2015 – 2040 RTP planning process and identify various issues and concerns.

UTAH'S UNIFIED PLAN

As the state population increases, travel demand in Utah will grow and continue to pose significant demands on the transportation system. Utah faces the substantial challenge of meeting travel demands with limited financial resources to maintain, preserve, improve, and expand transportation infrastructure. To coordinate these demands, UDOT, Cache Metropolitan Planning Organization (Cache MPO), Wasatch Front Regional Council, Mountainland Association of Governments (MAG), and the Dixie Metropolitan Planning Organization (Dixie MPO) have developed Utah's Unified Transportation Plan.

Utah's Unified Transportation Plan has been revised and updated as part of the 2015 – 2040 RTP process. This revision will follow the same general process that was established during the development of the 2007 – 2030 and 2011 – 2040 Regional Transportation Plans. The Wasatch Choice for 2040 Vision was used as a basis for the Urbanized Area of the Wasatch Front. The Regional Vision, along with its supporting Regional Growth Principles, have been formally adopted by the Wasatch Front Regional Council and a majority of its member cities and counties. Statewide transportation planning efforts are now much more closely coordinated then in the past and the updated Unified Plan for 2015 continues this tradition.

Historically, prior to the adoption of the WFRC's 2007 – 2030 RTP in May, 2007, UDOT and the state's four MPOs did communicate to a degree and notified each other of their planning efforts. However, there was no real effort made to coordinate certain aspects, such as the timing for adoption of various MPO regional transportation plans, among the five agencies. Each planning organization used different financial assumptions, planning cycles, baseline date, priority-setting procedures, formats, etc. As the Unified Plan process has evolved, many of these inconsistencies have been resolved. Each of the MPOs has accepted responsibility for preparing a transportation plan for their respective urbanized areas. Utah's Unified Plan contains the essence of these plan and reflects a common approach and planning schedule, uniform financial assumptions and inflation factors, consistency in document organization, a common public involvement approach, consistent criterion for project selection and prioritization processes, and standard performance measures by which to evaluate RTPs. With this Unified Plan, many of the criticisms and inconsistencies that were apparent in the past have been overcome and interactions with the Utah State Legislature on transportation priorities and funding issues will continue to be productive.

Joint Policy Advisory Committee

The WFRC and the Mountainland Association of Governments agreed in 2004 to form a joint committee to look at areas of common interest in transportation planning. The urbanized areas of Utah County and Salt Lake County have essentially grown together and creation of the Joint Policy Advisory Committee (JPAC) was in response to the recognized need for a coordinated planning process. The Utah State Legislature has also mandated cooperation between adjacent metropolitan planning organizations. JPAC has grown to include senior representatives form UDOT, UTA, WFRC, MAG, the Cache MPO, and the Dixie MPO. Important topics of discussion include the statewide and regional transportation planning process, smart growth concepts, adoption of the Wasatch Choice for 2040 Vision, and the development of Utah's Unified Transportation Plan.

ESTABLISH A REGIONAL VISION

Through community input, establish a shared vision as the basis for coordinated planning.

WASATCH CHOICE FOR 2040

Traditionally, transportation investments are made in reaction to local development patterns as proposed in community land use plans. More housing anticipated in one part of the region and more employment in another, affects where and what transportation facilities should be built. And yet, ironically, land use patterns and indeed local plans in turn react to transportation plans and investments. Developers recognize that improvements to access, say from a freeway interchange or a light rail stop, will increase the desirability of retail shopping, offices, and housing. Homebuyers are attracted to housing in areas due to the promise of shorter commutes. Shoppers are interested in locations that benefit from high-speed transportation access and businesses seek to relocate where they have good access to their workforce. Local governments are simultaneously reacting to increased developer interest that stems from transportation investment, and they also hope to capitalize on improved access by maximizing retail development, among other things. In short, there is a natural interaction between transportation and land use.

Because development patterns and transportation improvements affect each other, it makes sense for local governments and regional transportation agencies to closely coordinate planning efforts. The important question is, "How can we work together to produce the outcomes that optimize the long-term quality of life for communities and the overall metropolitan area?" This was the impetus behind the development of our Region's shared vision, the Wasatch Choice for 2040.

Downtown Salt Lake City

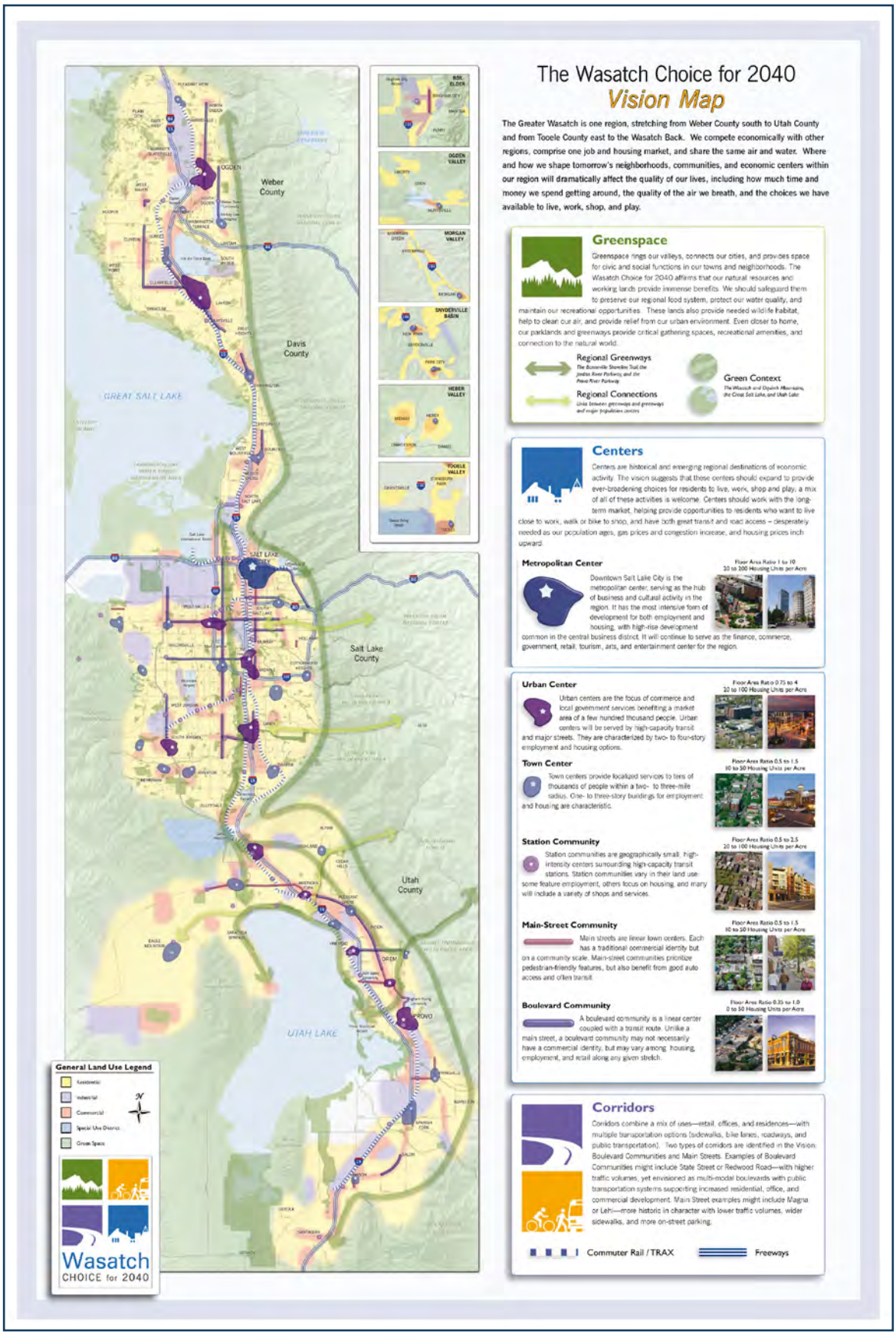
The type of growth that is occurring, how the Region is served by the transportation system, and the availability of open space, has a big impact on our quality of life. Together, these factors, along with other related conditions, affect our cost of living, time spent commuting, the air we breathe, how we enjoy our time with family and friends, and the neighborliness of the communities in which we live. The Wasatch Choice for 2040 Vision considers how growth, transportation, and open space can be shaped for the next few decades in such a manner as to have positive impacts on the lives of residents in the greater Wasatch Front area.

In short, we need to consider our joint goals for the long term, and then we can each individually consider the choices we want to make in the near term. This is especially important in our Region, where we anticipate well over a million more residents by 2040. The Wasatch Choice for 2040 Vision is the end product of the thoughts expressed by thousands of voices. Beginning with the Envision Utah effort, which led to the Quality Growth Strategy in 1999, residents from across the Region came together to explore a variety of potential futures and the benefits and disadvantages associated with each. Through additional workshops and public input, that vision was refined to a more specific vision for the Wasatch Front Region. Through this process, participants coalesced upon nine Principles for Growth, and a Vision Map, that focuses on a few distinct strategies for growth. The final product, known as "The Wasatch Choice for 2040 Regional Vision" is shown as **Map 2-1**.

Center-Focused Growth

Growth within centers is one of the key strategies of the Vision. As it turns out, strategic changes to a small percent of our metropolitan area – places like downtowns, main streets and station area communities – can yield huge benefits. These centers can become the focus of a strong market for accessible jobs and moderately priced and/or downsized housing units. Thus, these centers will grow where they do the most good for everyone – in centrally located areas and places with great transportation access. Centers have so many

MAP 2 - 1


The Wasatch Choice for 2040
Vision Map
The Greater Wasatch is one region, stretching from Weber County south to Utah County and from Tooele County east to the Wasatch Back. We compete economically with other regions, comprise one job and housing market, and share the same air and water. Where and how we shape tomorrow's neighborhoods, communities, and economic centers within our region will dramatically affect the quality of our lives, including how much time and money we spend getting around, the quality of the air we breath, and the choices we have available to live, work, shop, and play.
Greenspace
Greenspace rings our valleys, connects our cities, and provides space for civic and social functions in our towns and neighborhoods. The Wasatch Choice for 2040 affirms that our natural resources and working lands provide immense benefits. We should safeguard them to preserve our regional food system, protect our water quality, and maintain our recreational opportunities. These lands also provide needed wildlife habitat, help to clean our air, and provide relief from our urban environment. Even closer to home, our parklands and greenways provide critical gathering spaces, recreational amenities, and connection to the natural world.
Regional Greenways
Regional Connections
Green Context
Centers
Centers are historical and emerging regional destinations of economic activity. The vision suggests that those centers should expand to provide ever-broadening choices for residents to live, work, shop and play; a mix of all of these activities is welcome. Centers should work with the long-term market, helping provide opportunities to residents who want to live close to work, walk or bike to shop, and have both great transit and road access – desperately needed as our population ages, gas prices and congestion increase, and housing prices inch upward.
Metropolitan Center
Downtown Salt Lake City is the metropolitan center, serving as the hub of business and cultural activity in the region. It has the most intensive form of development for both employment and housing, with high-rise development common in the central business district. It will continue to serve as the finance, commerce, government, retail, tourism, arts, and entertainment center for the region.
Urban Center
Urban centers are the focus of commerce and local government services benefiting a market area of a few hundred thousand people. Urban centers will be served by high-capacity transit and major streets. They are characterized by two- to four-story employment and housing options.
Town Center
Town centers provide localized services to tens of thousands of people within a two- to three-mile radius. One- to three-story buildings for employment and housing are characteristic.
Station Community
Station communities are geographically small, high-intensity centers surrounding high-capacity transit stations. Station communities vary in their land use: some feature employment, others focus on housing, and many will include a variety of shops and services.
Main-Street Community
Main streets are linear town centers. Each has a traditional commercial identity but on a community scale. Main-street communities prioritize pedestrian-friendly features, but also benefit from good auto access and often transit.
Boulevard Community
A boulevard community is a linear center coupled with a transit route. Unlike a main street, a boulevard community may not necessarily have a commercial identity, but may vary among housing, employment, and retail along any given stretch.
Corridors
Corridors combine a mix of uses—retail, offices, and residences—with multiple transportation options (sidewalks, bike lanes, roadways, and public transportation). Two types of corridors are identified in the Vision: Boulevard Communities and Main Streets. Examples of Boulevard Communities might include State Street or Redwood Road—with higher traffic volumes, yet envisioned as multi-modal boulevards with public transportation systems supporting increased residential, office, and commercial development. Main Street examples might include Magna or Lehi—more historic in character with lower traffic volumes, wider sidewalks, and more on-street parking.
Commuter Rail / TRAX
Freeways
General Land Use Legend
Residential
Industrial
Commercial
Special Use District
Open Space
Wasatch
CHOICE for 2040
Weber County
Davis County
Salt Lake County
Utah County
GREAT SALT LAKE
UTAH LAKE
OGDEN
SALT LAKE CITY
PROVO
OREM
BOX ELDER
OGDEN VALLEY
MORGAN VALLEY
SNYDERVILLE BASIN
HEBER VALLEY
TOOELE VALLEY

benefits.

- Centers can help ensure all people have a selection of homes to meet their needs;
- Reduce the time, distance and money it takes for people to reach many of their destinations;
- Enable people to reach more of those destinations by foot, bike and transit in addition to car;
- Help businesses reach more consumers and employees to have a greater selection of jobs;
- Help improve the air quality;
- Create walkable communities;
- Reduce growth pressure on the "Wasatch Back";
- And reduce demand for scarce water.

Regional Growth Principles

The Wasatch Choice for 2040 Vision is embodied in nine Regional Growth Principles. These embody many of the values held by the people of Utah and were adopted after reviewing input from community workshops, open houses, committee deliberations, surveys and polling. The Growth Principles are intended to promote quality growth throughout the region. The WFRC, along with many other organizations and local governments, use these shared Growth Principles to provide a foundation for the organization's plans and programs. Together with other required transportation factors, the Growth Principles provide the framework for developing performance criteria, such as those regarding environmental quality, economic growth, cost effectiveness, enhanced mobility, safety, and related criteria. These criteria will then be used as a tool in identifying projects for the 2015 – 2040 RTP that best fulfill the objectives of the Growth Principles. The framers of these Growth Principles recognize that collaboration will be needed among the Region's local governments, and other decision-making groups, if these Principles are to be implemented and their potential benefits realized. These Regional Growth Principles are intended to assist the many entities involved in making plans for the future by providing a context that applies to the Region as a whole. As a consequence, it is hoped that the Wasatch Front Region's transportation and other services will become more efficient, and that its quality of life, largely identified in the Principles, will be enhanced. The regional growth principles and objectives are provided below.

Principle: Provide Public Infrastructure that is Efficient and Adequately Maintained

- Promote redevelopment to better utilize existing infrastructure.
- Optimize use and maintenance of existing infrastructure. Promote compact development consistent with market demand. Encourage contiguous growth to reduce infrastructure expenses.
- Develop long term funding sources for infrastructure development and maintenance.
- Encourage cooperation and coordination in the use of transportation and utility corridors and rights-of-way.

Principle: Provide Regional Mobility through a Variety of Interconnected Transportation Choices

- Develop a balanced, multi-modal transportation system.
- Coordinate transportation with regional employment, housing, educational and activity centers.
- Encourage future commercial and residential areas within close proximity of each other to reduce travel distances.
- Encourage a balance of jobs and housing in each part of the region to reduce travel distances.
- Support actions that reduce growth in per capita vehicle miles of travel.

Principle: Integrate Local Land-Use with Regional Transportation Systems

- Land-use planning and decisions remain a function of local communities.
- Preserve corridors for future infrastructure needs.
- Coordinate regional transportation with centers of development.
- Coordinate transportation decisions with schools and educational centers.
- Make land-use and transportation decisions based on comprehensive understanding of their impact on each other.

Principle: Provide Housing for People in all Life Stages and Incomes

- Encourage an adequate supply of moderately priced housing near regional job centers.
- Encourage land use and housing policies to accommodate the need for a variety of housing types throughout the region.
- Encourage housing and other development near transit to maximize the efficiency of the public transportation system.

Principle: Ensure Public Health and Safety

- Encourage communities to develop transportation facilities that promote physical activity and healthy living.
- Encourage accessibility of housing to other destinations to enable the routine use of walking and bike paths.

- Provide for a safe and adequate water supply for culinary, sanitation and fire protection needs.
- Promote interconnected streets to reduce travel distances.
- Provide efficient police and emergency access.
- Provide safe access to, and use of, all modes of transportation.

Principle: Enhance the Regional Economy
- Improve mobility to foster a robust economy.
- Use transportation investments and land use decisions to develop the regional economy.
- Transportation and land use decisions should lead to improved quality of life to help retain and recruit businesses and labor.
- Transportation and land use decisions should help keep our region an affordable place to live and do business.

Principle: Promote Regional Collaboration
- Encourage collaboration among government, business, education, civic and community organizations.
- Coordinate development and maintenance of regionally significant utilities and transportation facilities.
- Include a broad base of involvement in the planning process.
- Coordinate local and regional planning efforts.
- Promote the sharing of information and expertise.

Principle: Strengthen Sense of Community
- Preserve environmental, cultural, and historical assets.
- Promote unity and cohesiveness while valuing diversity.
- Avoid physically dividing communities.
- Use transportation to bolster town centers.

Principle: Protect and Enhance the Environment
- Protect and enhance the natural environment.
- Enhance the aesthetic beauty of our built environment.
- Promote conservation of energy, water, and regionally significant critical lands.
- Enhance air and water quality.
- Encourage conservation of open space and irreplaceable natural resources in land use decisions.
- Create and enhance access to areas of natural beauty and recreation.
- Encourage community trails coordinated with regional/state trail systems.

WFRC GOALS FOR TRANSPORTATION PLANNING

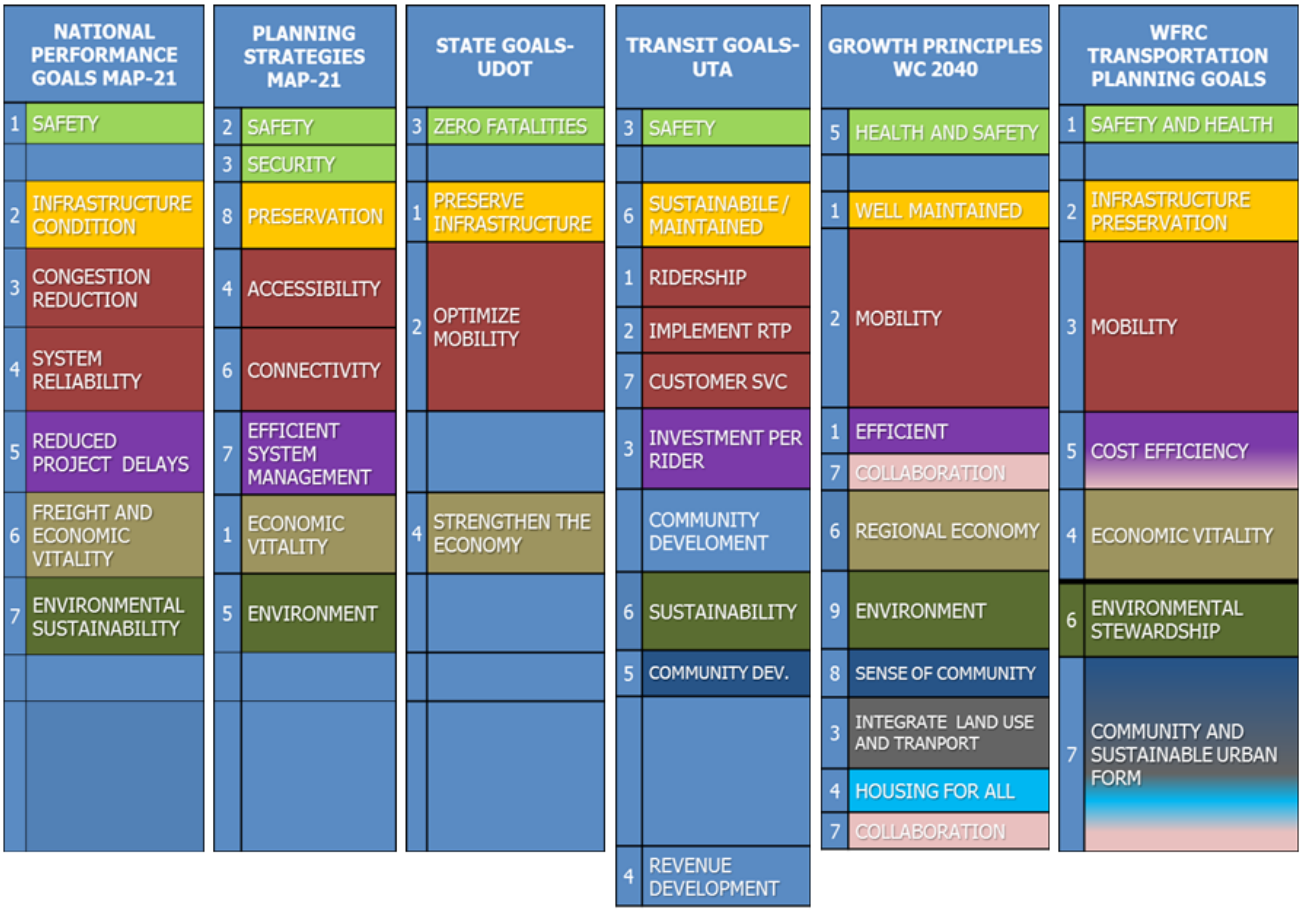
The Regional Transportation Plan is a goal driven process. The seven goals established by the Wasatch Front Regional Council inform each major step of the planning process. The seven goals are as follows:
- Safety and Health
- Infrastructure Preservation
- Mobility
- Cost Efficiency
- Economic Vitality
- Environmental Stewardship
- Community and Sustainable Urban Form

These seven goals crystallize the key issues and concerns of the public as voiced in the Wasatch Choice for 2040 Growth Principles while also reflecting the goals of our federal, state, and regional transportation partners. **Figure 2-1** provided a side-by-side comparison of these various goals.

The Wasatch Choice for 2040 Growth Principles, from which the 2015 – 2040 RTP goals are derived, are the distillation of years of public comments from thousands of participants. They are the values that the public care about. The Growth Principles are a key product of the innovative and award winning grassroots Envision Utah outreach effort launched in 1999. The Growth Principles have been adopted by the WFRC and many of the local governments in the metropolitan area.
The 2015 – 2040 RTP transportation planning goals are also reflective of federal statute. A key feature of the MAP-21 funding authorization was performance based planning. MAP-21 lays out a set of national goals and planning strategies to pursue with the objective of providing "... a means to the most efficient investment of federal transportation funds by refocusing on national transportation goals, increasing accountability and transparency... and improving project decision-making..." [§1203; 23 USC 150(a)] Again, **Figure 2-1** summarizes the national goals and planning strategies and demonstrates how they are reflected in the WFRC transportation planning goals. This figure also paraphrases UDOT and UTA goals and demonstrates how they relate to the WFRC transportation planning goals.

Finally, the WFRC Transportation Planning Goals directly relate to the Strategic Goals of the Utah Department of Transportation and to overarching goals articulated by the Utah Transit Authority. The Utah Department of Transportation and Utah Transit Authority are key transportation partners in that they own, operate, and

FIGURE 2 - 1 FEDERAL, STATE, AND REGIONAL GOAL COMPARISON



maintain the vast majority of the regionally significant transportation infrastructure in the Region.

The 2015- 2040 RTP required the establishment of seven transportation planning goals. These goals inform each major step of the planning process. The Region's transportation goals were then translated into specific performance measures which allows the WFRC staff to determine to what degree we are meeting our goals and facilitates the discussion of trade-offs inherent in planning. The 2015- 2040 RTP planning process steps using performance measures are: visioning; preferred scenario development; project refinement; and project phasing.

The regional visioning process used performance measures and considerations reflecting the Growth Principles. In 1999, the Envision Utah process, upon which the 2040 Vision was initiated, offered four growth scenarios to the public. With each scenario was a "report card' illustrating how each of the four scenarios might perform on key measures developed from the Growth Principles.

Among other places, the scenarios and accompanying report cards were published in a full-page format in local newspapers. Thousands of people participated. Subsequent updates to the 2040 Vision have also utilized performance measures based upon the Growth Principles. These Growth Principles are now reflected in the seven 2015 – 2040 RTP transportation planning goals.

The draft 2015- 2040 RTP preferred scenario was also developed using a set of performance measures. All four future land use and transportation scenarios were evaluated. Each scenario represented a relatively modest variation in land use accompanied by a set of broadly, cost-constrained transportation facility investments. The four scenarios were evaluated using measures reflecting the seven goals. The performance of each of the scenarios, ultimately including the preferred scenario, was compared side-by-side for each performance measure. This data informed the development of the preferred scenario and was provided to our stakeholders. A listing of the performance measures and selected findings are available in the chapter titled Create and Evaluate Scenarios.

Projects from the initial preferred scenario were also refined and selected using performance measures tied to the seven Goals. Projects were reviewed based upon a high-level consideration of potential opportunities to avoid impacts and optimize benefits. Flagged projects were considered for revision or removal, in consultation with the project sponsor, based upon discussions of the totality of the benefits and impacts. Projects completing this process were selected for the final Preferred Scenario which defines non-fiscally constrained project needs. A listing of the considerations is provided in the chapters titled Create and Evaluate Scenarios and Select Projects and Phase.

Lastly, projects from the final Preferred Scenario were rated in order to inform project phasing using performance measures representing the seven Goals. With a few exceptions road and transit projects used the same high-level performance measures such as "travel time reduction" but different data sets and methods to evaluate project performance. Detailed descriptions of road and transit project performance measures are found in the chapters titled Create and Evaluate Scenarios and Plan Impacts and Benefits.

ASSESS NEEDS

Determine overall population projections that will shape transportation, housing, and growth patterns, etc.

INTRODUCTION

As the Wasatch Front Region grows and the impact of development patterns emerge, the travel demand for all transportation modes will increase and the need to manage all elements of the transportation system will become much more pronounced. This chapter describes the system-wide needs the WFRC has identified through analysis of current and future travel patterns, and other means.

Major Future Travel Demand Corridors

In order to fully identify transportation system needs, future travel demand must be quantified. The regional travel demand model facilitates analyses to provide this information. A detailed documentation of this modeling process is provided in Appendix A, entitled "Transportation Modeling and Analysis Tools." The projected 2040 desire lines of travel are displayed in **Figure 3-1**, the width of the line indicating the magnitude of the travel flows. The largest intra-county 2040 travel flows are shown in addition to each of the north-south, urban inter-county flows. The magnitude of the inter-county travel flow arrows illustrates the interconnected economy of the Wasatch Front Region. Based upon regional district to district trip estimates, illustrated in **Map 3-1** on the following page, it appears that the primary travel flows, in order of magnitude, is indicated below:

- East / West flow between northwestern and northeastern Salt Lake County
- North / South flow across the Salt Lake / Utah County line
- North / South flow between southwestern and northwestern Salt Lake County
- North / South flow across the Davis / Weber County line
- East / West flow between southeastern and southwestern Salt Lake County
- North / South flow across the Salt Lake / Davis County line
- East / West flow between western and southeastern Weber County

A review of more detailed travel demand forecasts for 2040 indicated that the following six major corridors will experience the most serious mobility deficiencies.

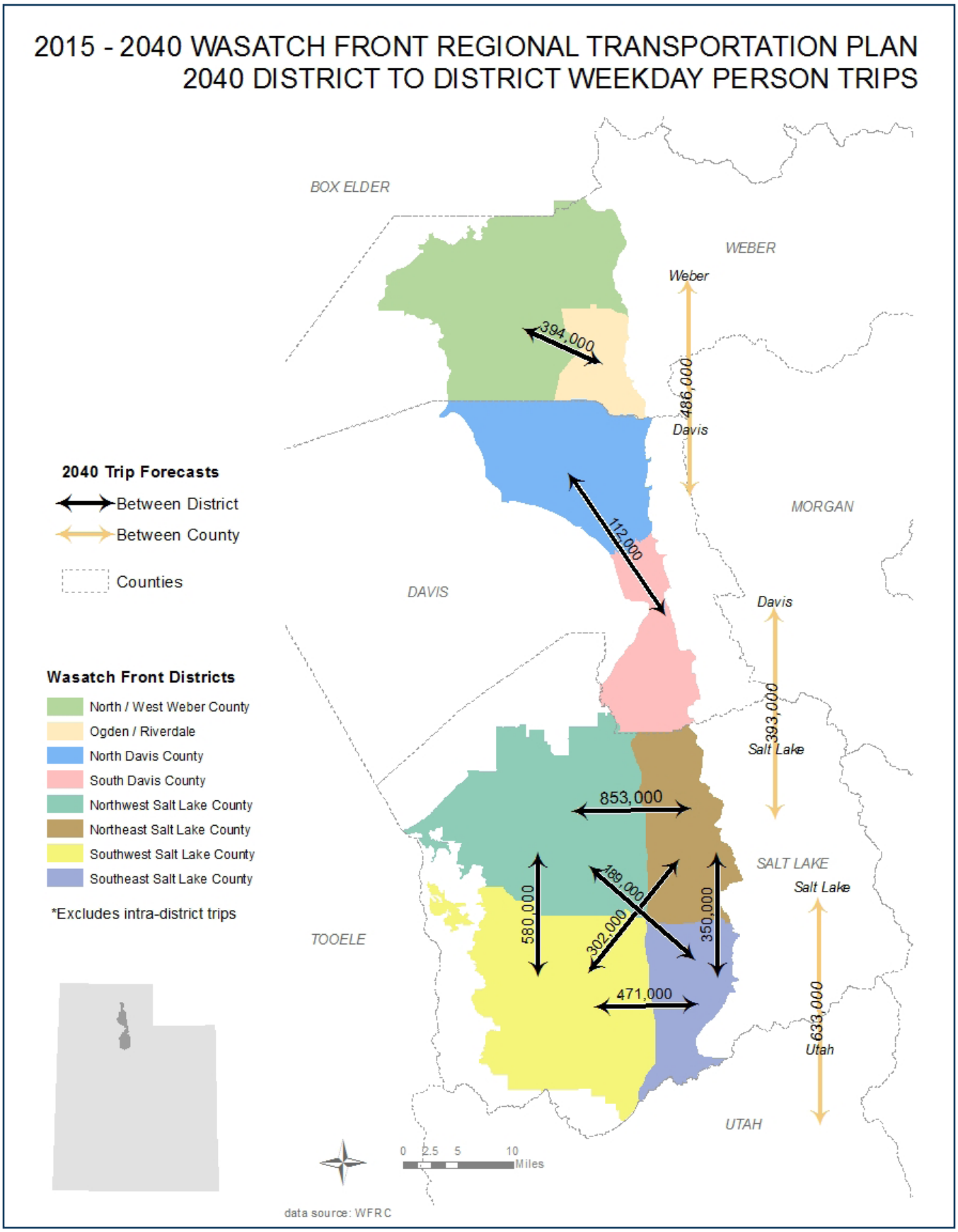
- I-15 along the Wasatch Front in Weber, Davis and Salt Lake Counties
- East / West flow in the southwest quadrant of Salt Lake County (between 6200 South and 14600 South)
- East / West flow in the central west portion of Salt Lake County (between 3100 South and 6200 South)
- North / South flow in southern and western Salt Lake County
- North / South and East / West flow in northwestern Davis County
- East / West flow in western Weber County

Traffic Congestion

Often in high growth areas, new capacity (supply) seems to be prematurely congested by recurring commuter traffic and non-recurring accidents and construction. In "supply" and "demand" terms, the travel "demand" is the number of vehicles (drivers) wanting to use the roads and the "supply" is the volume of vehicles that a road can carry in the peak period. The highway system provides exceptional mobility until it breaks down because of daily congestion at choke points or irregular incidences such as crashes. Congestion then is compounded because, as demand increases in the peak periods, supply declines when speeds are reduced.

Downtown Salt Lake City

MAP 3 - 1


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
2040 DISTRICT TO DISTRICT WEEKDAY PERSON TRIPS
BOX ELDER
WEBER
Weber
394,000
486,000
Davis
MORGAN
112,000
DAVIS
Davis
393,000
Salt Lake
853,000
SALT LAKE
Salt Lake
189,000
580,000
302,000
350,000
TOOELE
471,000
633,000
Utah
UTAH
2040 Trip Forecasts
Between District
Between County
Counties
Wasatch Front Districts
North / West Weber County
Ogden / Riverdale
North Davis County
South Davis County
Northwest Salt Lake County
Northeast Salt Lake County
Southwest Salt Lake County
Southeast Salt Lake County
*Excludes intra-district trips
0 2.5 5 10
Miles
data source: WFRC

When freeways reach capacity, they lose up to thirty percent of their ability to move traffic efficiently. For example, a 10-lane freeway can carry about 21,000 vehicles going at a speed of 60 miles per hour. When the situation degrades to an average speed around 20 mph, the 10-lane freeway can only carry about 15,000 vehicles. Transit, on the other hand, can be expanded by adding passenger cars to peak hour trains without reducing the service speed. Regional transit is better suited to the peak hour travel demand and will best succeed where access, travel time, convenience, cost and comfort are attractive when compared with congested auto travel.

The auto / highway system will remain the dominant mode in the Region through 2040. However, creative strategies are needed to avoid compounding highway congestion. At its most fundamental level, highway congestion results from the lack of mechanisms to efficiently manage use of highways. Therefore, this needs analysis will consider new policy choices and innovative solutions including congestion pricing measures and intelligent transportation systems (ITS) to manage the peak period demand.

The Role of Regional Growth Principles

The growth principles adopted by the Regional Council, and described in more detail in the Wasatch Choice for 2040 Vision, are important for protecting the quality of life in the Wasatch Front Region, even with respect to relieving congestion. For example, when regional land use patterns foster closer proximity between housing and jobs, the origins of most work trips are less dispersed, trip lengths to places of employment are reduced and vehicle miles of travel decrease. Thus, there will be less congestion and more opportunities for transit to offer viable alternatives.

The following sections in this chapter explore more specific needs in the greater Wasatch Front Region for highways, transit, and other modes of transportation. Managing the transportation system is also discussed further, including a review of safety and security conditions.

HIGHWAY SYSTEM REVIEW

As part of the Congestion Management Process (CMP), the WFRC reviewed projected highway congestion conditions and identified a number of locations where congestion mitigation is or will be needed. The CMP involves an evaluation of Transportation System Management (TSM) strategies, such as signal coordination, intersection widening, and access management; and Transportation Demand Management (TDM) strategies, include ridesharing, high occupancy vehicle (HOV) lanes, and telecommuting, as potential solutions to regional congestion rather than increasing highway capacity. Locations have been identified where TSM and TDM strategies can delay or eliminate the need for new capacity. Where these strategies cannot meet the projected travel demand, the need for new capacity is noted. Whenever additional capacity is added, TDM efforts to reduce demand should be employed, and the transportation system made as efficient as possible in order to maximize the effectiveness of the new capacity and minimize the need for future capital investments in highways.

For 2015 – 2040 RTP development purposes, congestion is considered to occur when level of service (LOS) "E" conditions are reached. Traffic operating at LOS "E" is characterized by operations that are very unstable at significantly reduced speeds and when there are virtually no gaps in the traffic stream. Level of service is based on volume to capacity ratios (V/C) in the case of freeways, and operating speeds in the case of arterials. The WFRC continues to support the actual design of facilities to meet a LOS "D" in urban areas when reasonably possible. Traffic operating at LOS "D" is characterized by reduced speeds and restricted ability to maneuver within the traffic stream. Any incident disrupting the traffic flow at LOS "D" will immediately result in LOS "E" conditions or worse. For a more complete discussion of level of service, see Sections 15-II and 23-II of the Highway Capacity Manual.

The process for identifying congestion needs for the 2015 – 2040 RTP begins with a computer model of existing highway and transit facilities plus major capacity projects in the Transportation Improvement Program (TIP), which are committed to be built. This transportation network is then assigned projected 2040 traffic demand and the resulting travel model is identified as the "2040 No Build" scenario. The "2040 No Build" scenario is then further modified with a series of TSM and TDM strategies, plus the fully implemented transit program recommended in the previous 2011 – 2040 RTP, with peak-period headways optimized to 10 minutes for buses and 15 minutes for light rail service. The resulting modeled transportation network is identified as the "2040 Congestion Management Process" scenario. The specific TSM and TDM strategies that can be represented in the 2040 CMP model are limited to signal coordination, access management, pedestrian and bicycle facilities, and a combined factor for flextime, telecommuting, and growth management. The WFRC selected these

TABLE 3 - 1 AVERAGE WEEKDAY TRAFFIC VOLUME GUIDELINES

NUMBER OF LANES NEEDED	FREEWAYS (vehicles)	ARTERIALS (vehicles)
4	< 90,000	20,000 – 40,000
6	90,000 - 140,000	40,000 – 60,000
8	> 140,000	> 60,000

specific TSM and TDM strategies because reasonable quantitative assumptions can be made about the impact of these measures on speeds or capacity. The benefits of ITS, incident management and ramp metering are already included in model assumptions for highway capacities. Likewise, the mode choice algorithms in the model already account for the trip reductions achieved by modeling the 2040 preferred transit and rideshare program.

Once the TSM and TDM strategies are applied in the model, locations where level of service (LOS) "E" conditions still remain in the PM peak period are evaluated. Average weekday traffic volumes for 2015 and 2040 are also considered. **Table 3-1** identifies guidelines for Average Weekday Traffic (AWKDT) Volumes, which supplements the evaluation of LOS "E" conditions identified by the CMP model run. Since the travel model is regional in nature, individual facility volumes may reveal differences between modeled and observed base year volumes and these discrepancies are considered when evaluating future traffic conditions. Historical growth rates can also provide reasonableness checks.

CMP Identified Capacity Needs

A list of RTP recommended projects and priorities is found in Appendix D, entitled "Congestion Management Process Projects." One of the criteria in this table is CMP Justification, which indicates whether or not a project recommended in the 2015 – 2040 RTP was also recommended based on the CMP analysis. All capacity increasing projects listed in Appendix D have been identified with at least one of the recommendations from the Congestion Management Process listed in **Table 3-2**.

TRANSIT SYSTEM REVIEW

Transportation demand in the region has grown substantially in recent years and is projected to continue to grow as population in the Wasatch Front Region nearly doubles. The primary way the Region has chosen to address this growth challenge is through the implementation of the Wasatch Choice for 2040 Vision, which calls for centered development served by high frequency transit. Transit performs a unique role in serving the transportation needs of a maturing region. Roads will generally degrade in their capacity to meet travel demand, whereas transit can thrive in such conditions. The evaluation of the Region's transit system needs draws upon the 2011- 2040 RTP's transit system review and other recent and related evaluations.

State of Good Repair

State of Good Repair (SOGR) refers to maintenance, overhaul, and replacement of assets like rail and bus vehicles, railroad track and Bus Rapid Transit lanes, railroad crossings, and station platforms. The SOGR is a challenge for transit systems nationwide. As physical assets fall into disrepair, they decrease transit reliability, attractiveness, and safety. Proper maintenance of assets also costs less than replacement. SOGR policies are specifically listed in the UTA Strategic Plan.

Between 1996 and 2014, the Wasatch Front Region undertook one of the most aggressive rail construction programs in the country. During this time, 134 miles of rail were built along the Wasatch Front at a cost of approximately $4.7 billion in current year (2015) dollars. The Utah Transit Authority now has nearly 1,100 buses / vans, 200 rail vehicles, and multiple operations and administrative facilities with related equipment. These investments as well as new projects added in the 2015 – 2040 RTP need to be maintained in order to preserve ridership, safety, and avoid enormous replacement costs in the future.

- In 2014, UTA reported a $200 million backlog in rail SOGR.
- The UTA Central Bus Maintenance Facility is operating at over 125 percent of its design capacity. The UTA indicates that it needs to be replaced due to aging infrastructure and functional deficiencies.
- The latest federal reauthorization of transportation funding legislation requires transit agencies to develop an asset management plan. The Utah Transit Authority is developing such a plan. A programmatic line item was established as part of the 2015 – 2040 RTP with funding set aside for SOGR and asset management.

TABLE 3 - 2 CONGESTION MANAGEMENT PROCESS RECOMMENDATIONS

CMP RECOMMENDATION	CMP IMPROVEMENT DESCRIPTION
Phase 1	Phase 1 – capacity need based on LOS "E"
Phase 2	Phase 2 – capacity need based on LOS "E"
Phase 3	Phase 3 – capacity need based on LOS "E"
TSM – Phase 1, 2, or 3	No capacity increase recommended. Transportation System Management improvement recommended in the Phase indicated
Trucks	Concentration of trucking activity justifies a capacity increase
Safety	Known safety concerns justifies a capacity increase
Network	A gap in the regional grid network of highways that leads to circuitous travel justifies a capacity increase (usually a new facility that completes a missing segment of the network.)
Bottleneck	A bottleneck or a short highway segment that has higher existing capacity (more lanes) on either end, justifies a capacity increase to eliminate recurring delays.
Operational	Traffic operation improvements are recommended without additional through-lane capacity
ROW	Right-of-way acquisition recommended

Span of Service

Span of Service (SOS) refers to the hours of the day, days of the week, and holidays during which transit service is provided. Span of service is a substantial element in UTA's strategy to increase levels of transit service by 50 percent. Good SOS is essential to effective transit oriented development and to disadvantaged communities. These are communities that, by choice or by necessity, are dependent upon transit service for a broad array of their travel needs. Members of disadvantaged communities are also more likely to have work or educational travel needs outside of the commute periods. The Region's development goals, as embodied in the Wasatch Choice for 2040 Vision, are largely dependent upon centered growth near transit lines. To succeed, the transit serving these centers need to have consistently good transit SOS. Nonetheless, transit managers need to weigh the benefits of increased SOS for transit dependent people and against other transit priorities.

- TRAX hours of service are approximately 5:00 A.M. to 11:00 P.M. on weekdays; 6:30 A.M. to 10:30 P.M. on Saturdays; and 10:00 A.M. to 7:00 P.M. on Sundays. No service is offered on several holidays. Although service hours on some segments of the Salt Lake-Sandy and Mid-Jordan Corridors is limited to between 12:00 A.M. and 5:00 A.M., due to Federal Railroad Administration regulations regarding joint corridor use with freight rail operations, substantial span of service improvements are desirable.
- UTA FrontRunner hours of service are approximately 5:00 A.M. to 10:30 A.M. on weekdays and 8:00 A.M. to 11:00 P.M. on Saturdays with no service provided on Sundays. Similar to light rail, no service is offered on several holidays. Several transit oriented developments in Davis and Weber Counties are dependent upon UTA's FrontRunner service. Thus, SOS improvements in these counties would be particularly desirable. Service hours on some segments of the FrontRunner corridor are also limited due to Federal Railroad Administration regulations regarding joint corridor use with freight rail operations.
- Bus hours of service vary dramatically by route and by day of the week. **Figure 3-1** on the following page illustrates the proportion of UTA routes starting service by various times of morning. The three pie charts compare weekday and weekend service, including routes not in operation. Similarly, **Figure 3-2** illustrates the proportion of UTA routes going out of service at the end of their respective runs during evening hours. Please note that these are the times when the vehicles are at the start or end of their route and not when riders can first arrive at their destination or could catch the last bus home. The typical end-to-end travel time for a transit vehicle on a route is about 45 minutes.

Frequency of Service

Frequency of Service (FOS) refers to the span of time between the arrival and departure of transit vehicles along a route during both the peak and off-peak time periods. FOS is a substantial element in UTA's strategy to reduce the average customer trip time by 25 percent.

FIGURE 3 - 1 BUS ROUTE START TIMES

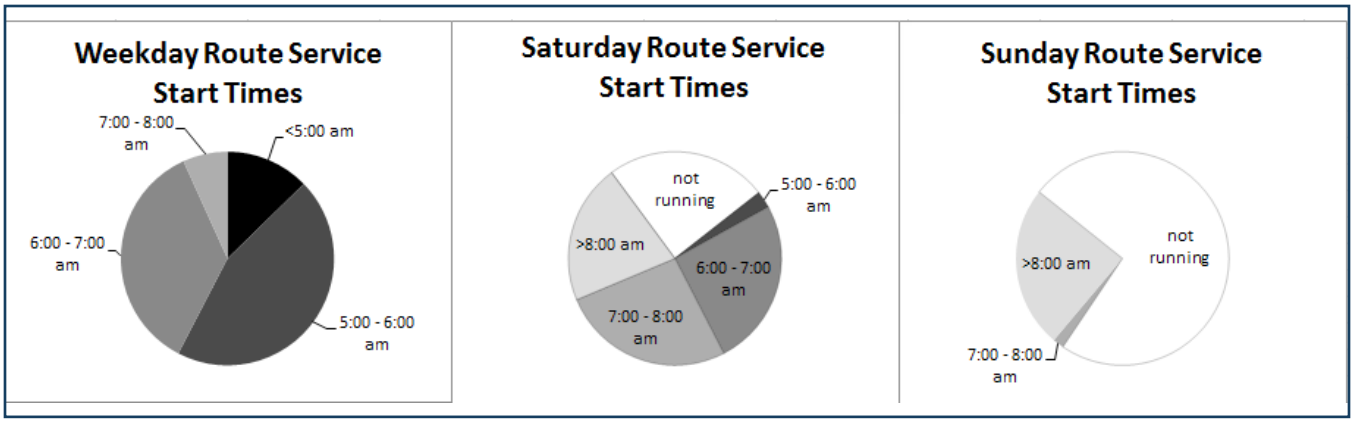
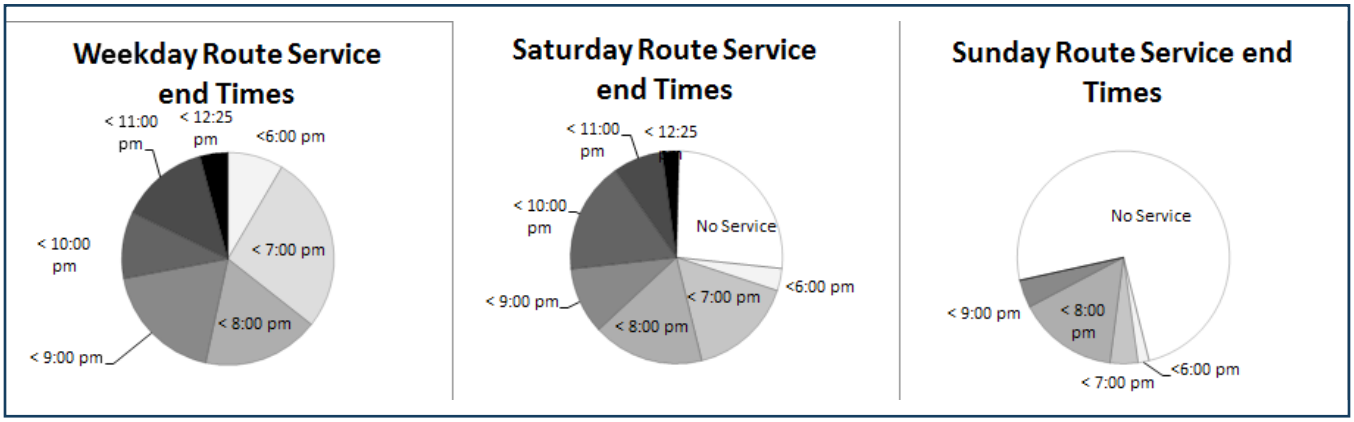


FIGURE 3 - 2 BUS ROUTE END TIMES



Frequency improvements will feature prominently in meeting the goal of increasing levels of transit service by 50 percent. Good FOS is also essential to fostering effective transit oriented development and system connectivity. Frequency is often conversely related to transfer wait times which can be the most taxing part of the transit experience for the rider. While waiting, the transit user is exposed to the elements and may experience some concern that they might have missed their connection. A generally accepted threshold for level of service for line-to-line transfer and for transit oriented developments is frequencies of 15 minutes or better during work hours. Improved service frequency must be balanced against potential ridership gains, transit oriented development benefits, and other factors to most effectively use limited resources.

- Light Rail (TRAX) frequencies are generally every 15 minutes on weekdays and every 20 minutes on weekends.
- UTA FrontRunner frequencies are generally 30 minutes service in the peak periods and 60 minutes in the off peak.
- Bus frequencies very substantially. UTA operates several levels of bus frequency. The Route 35 Bus Rapid Transit (MAX BRT) on 3500 South operates on full TRAX frequencies over the course of each day. Fifteen minute peak period service is offered on 15 core routes in northern Salt Lake County and in Ogden. Thirty minute peak period service is offered on the majority of the remainder of its routes with the exception of its inter-county service and some flex routes.

Service Reliability and Capacity

Service reliability refers to a predictable, dependable, and time-sensitive operation. Transit riders have been found to be more sensitive to unpredictable delay than transit speed or frequency of service. Repeated unreliability may prompt a transit planner to schedule extra time into a route resulting in low speeds even when street conditions would permit otherwise.

Nearly all of UTA's bus service is impacted by highway congestion. In order to keep its current service schedule in the face of increasing vehicle delays, several improvements will need to be made to the highway system in order to preserve existing bus

TABLE 3 - 3 EXISTING CANDIDATES FOR PRESERVATION OF OPERATION IMPROVEMENTS

ROUTE NUMBER	ROUTE NAME	ISSUES AND OPPORTUNITIES
603	Ogden - Weber State University	High Ridership
612	Washington Boulevard	High Ridership
470	Ogden – Salt Lake Intercity	High Ridership, Low Reliability, Standing loads
2	"2 the U"	High Ridership, Standing Loads
200	State Street North	Highest Ridership, Low Speed,
217	Redwood North	High Ridership, Low Reliability
227	2700 West	Slow Speeds
232	3200 West	Low Reliability

system operations. Enhanced Bus and Bus Rapid Transit improvements include signal priority and queue jumpers at select traffic signals in order to maintain reliability. Bus Rapid Transit lines further improve reliability through the use of transit lanes along substantial portions of the project. **Table 3-3** lists existing candidates for preservation of operations improvements including some with poor reliability, slow speeds, and standing loads.

Service Coverage and Accessibility

Service coverage refers to the general proximity of transit to homes and businesses and service accessibility, also known as "first / last mile accessibility," refers to the more enhanced accessibility of each transit stop via foot or bike. The latter takes into account physical barriers between a transit stop and the surrounding neighborhoods. Service coverage and accessibility is embodied in UTA's strategy to "find and attract new markets for ridership" and to "develop a fully integrated first / last mile strategy".

- Currently approximately 85 percent of the population and 96 percent of the employment in the WFRC area are within a half mile of a bus route or rail station. Nonetheless, areas without transit coverage continue to exist. Efforts to find and serve appropriate markets within areas without transit coverage should continue.
- Community design in the latter half of the last century frequently resulted in people and jobs being located in lower-density, effectively walled subdivisions and business parks that limit people's access to goods, services and each other. This has also created huge barriers to transit use and has fostered greater dependence on personal vehicles. More dependence upon autos has in turn resulted in wider, more heavily trafficked, and polluted roads, which become disincentives to transit use in a vicious cycle. The WFRC and UTA seek to develop a fully integrated first/ last mile strategy to allow greater access between transit and adjacent communities by first integrating first/ last mile strategies into the siting of new major transit investments and opening up access to existing high frequency bus and rail lines.

OTHER TRANSPORTATION MODE NEEDS

In addition to highways and transit, other modes are part of the Region's transportation system. These other non-motorized modes serve important functions, such as bicycle and pedestrian on and off-street paths that provide alternative transportation choices and opportunities conducive to healthy life styles and further the goals of the Wasatch Choice for 2040 Vision. Reliable movement of goods is addressed in part by the highway system, but railroads also play a vital role. The needs of these other modes, including truck freight are discussed in this section.

Pedestrians / Bicycles

According to the Utah Household Travel Survey conducted in 2012, about 1.7 percent of the trips in the Region were made by bicycle and 7.8% of the trips were made on foot. When diving deeper into this data, about 14% of the bike trips were made for the purpose of school or work. While bicycle and pedestrian trips are not the majority transportation modes, they are noticeably increasingly throughout the region as these modes gain popularity, accessibility and additional

facilities.

More importantly, providing the option of walking and biking for residents, particularly for connecting shorter trips that are less than two miles, is critical to support the continued growth of alternative transportation modes. The data from the 2012 Regional Household Travel Survey supports this as over 57 percent of the bike trips in our region comprise of less than two miles in distance.

Throughout the Wasatch Front, the demand for appropriate bicycle and pedestrian facilities has been rapidly growing as seen in numerous planning efforts. To address the needs of growing numbers of bicyclists and pedestrians, the WFRC recommends building upon the existing network and that state and local governments provide new on and off street facilities such as on east / west routes, providing access across I-15 and other major roadways, connections to transit stations and the connectivity of existing routes.

To date, the Utah Collaborative Active Transportation Study (UCATS) has established a regional priority network along the Wasatch Front. This study looked to address a systematic region-wide need for active transportation and to prioritize bicycle and pedestrian facilities based off the analysis. The study conducted a latent demand model analysis that included Salt Lake, Davis, Box Elder and Weber Counties for two modes, both walking and biking. The latent demand model took into account specific factors of population and employment density, intersection density, current land use mix, proximity to schools, distance to parks, universities, proximity to bus stops, fixed rail stations, demographic equality with poverty level, households with no automobile ownership, the location of limited-mobility age cohorts, and the presence of existing bike facilities. The analysis examined reasonable true walking and biking distance, which is the most accurate type of analysis. The latent demand measurement is quantified with a score of 1 to 100. The higher the score, the more likely there is to be demand for bicycling and walking activity. This map of the analysis for bike demand for Weber and Davis Counties is **Map 3-2** and for Salt Lake County is **Map 3-3** on the following page and highlights key hot spots for bicycle facility need in blue and green. This map of the analysis for bike demand for Weber and Davis Counties is **Map 3-4** and for Salt Lake County is **Map 3-5** on the following page and highlights key hot spots for bicycle facility need in blue and green.

Also part of the Utah Collaborative Active Transportation Study analysis on need included an accessibility study of current bike facilities to existing transit stations. The distance one could travel on the current roadway trail network as the crow flies to the existing bike and pedestrian network is included in the attached map on the following page. The higher the percentage, the more accessible the station is therefore both the need to connect to highly accessible transit stations combined with stations that did not have any service is highlighted.

Other significant areas of considerable bicycle and pedestrian travel and need are secondary schools, the two of our Region's major urban centers of Salt Lake Central Business District, and the Ogden Central Business District. For a more comprehensive picture of school locations, see **Map 3-6**. One of the primary considerations in planning for the needs of pedestrians and bicyclists must be safety. To be safe, pedestrians need adequate sidewalks and street crossing opportunities. For bicyclists, a system is needed of separated bikeways and designated routes on safe streets that allow free movement throughout the Wasatch Front Region. School children represent a special class of pedestrians and bicyclists who require unique facilities to ensure their safety.

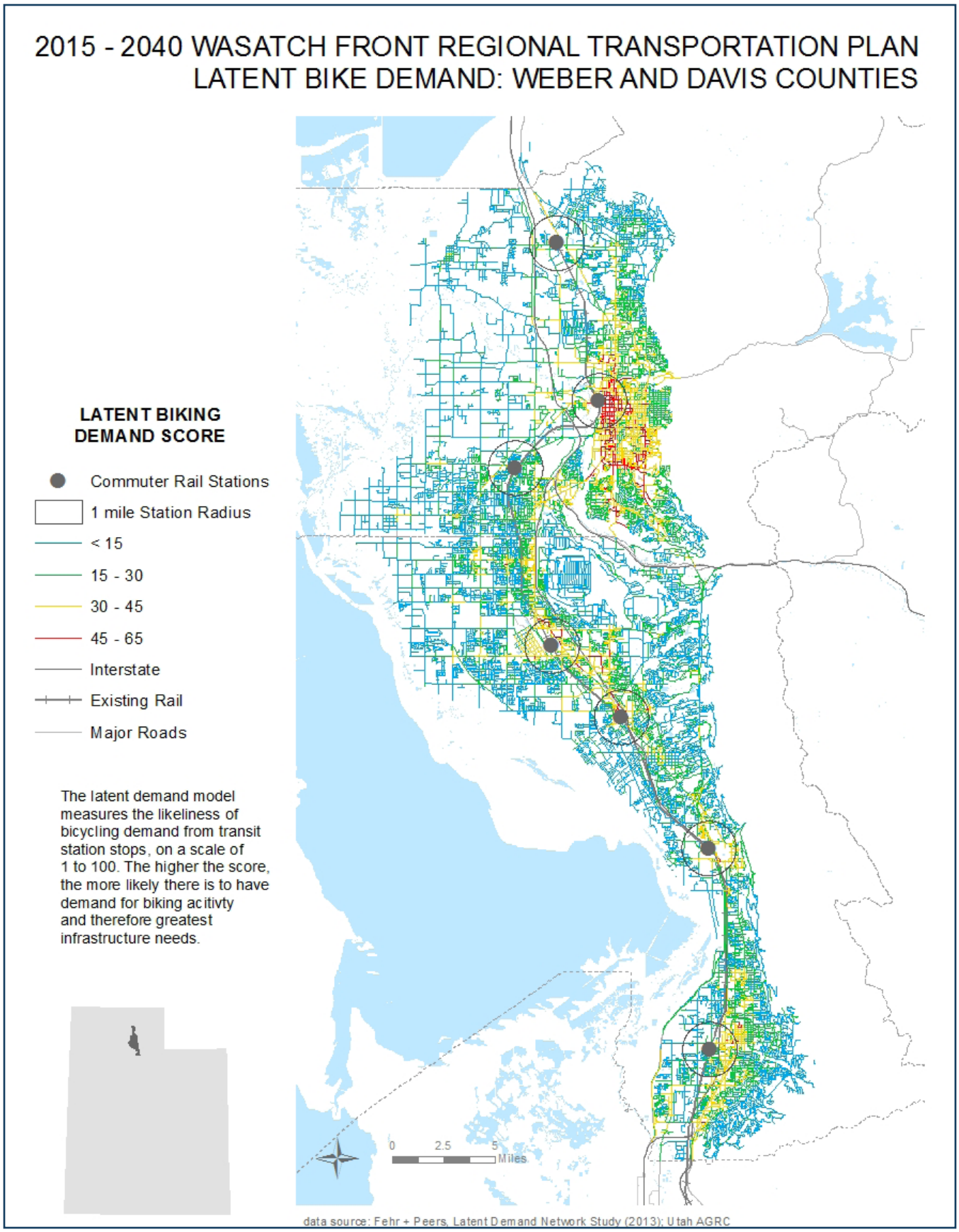
FREIGHT NEEDS

Each year, over 200 million tons of freight is shipped by or received by Utah manufacturers and businesses with an estimated value of nearly $134 billion. Trucks account for almost 70 percent of Utah's freight tonnage, with railroads hauling approximately 25 percent. These numbers do not reflect the considerable freight tonnage passing through Utah. With the recent completion of a Utah State Rail Plan, establishment of the Utah Freight Mobility Group (Statewide Freight Planning Group) and discussions with trucking associations and others in the freight industry, the following trucking and railroad related needs have been identified. **Map 3-7** on the following page shows the Wasatch Front Region's major freight facilities.

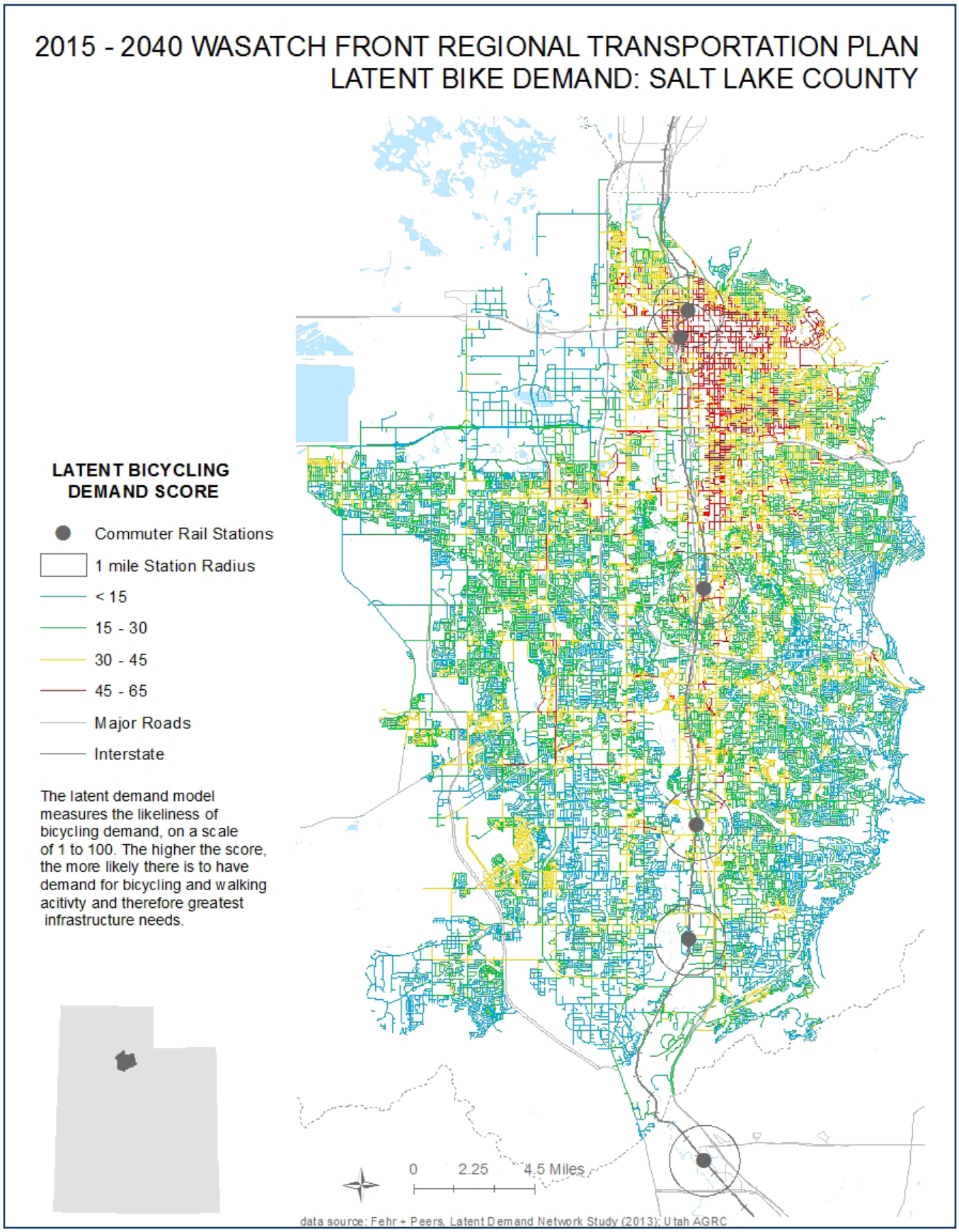
Trucking

- Interchange and intersection improvements at key locations near warehouses, oil refineries and other truck facilities to provide turning radii sufficient for trucks to move through unimpeded
- Turn lanes of adequate length and signal timing at intersections with high truck volume
- Road widening near the largest concentrations of industrial parks and warehouses
- Advance signal warning systems on high speed expressways
- Improved access to industrial parks and oil refineries,

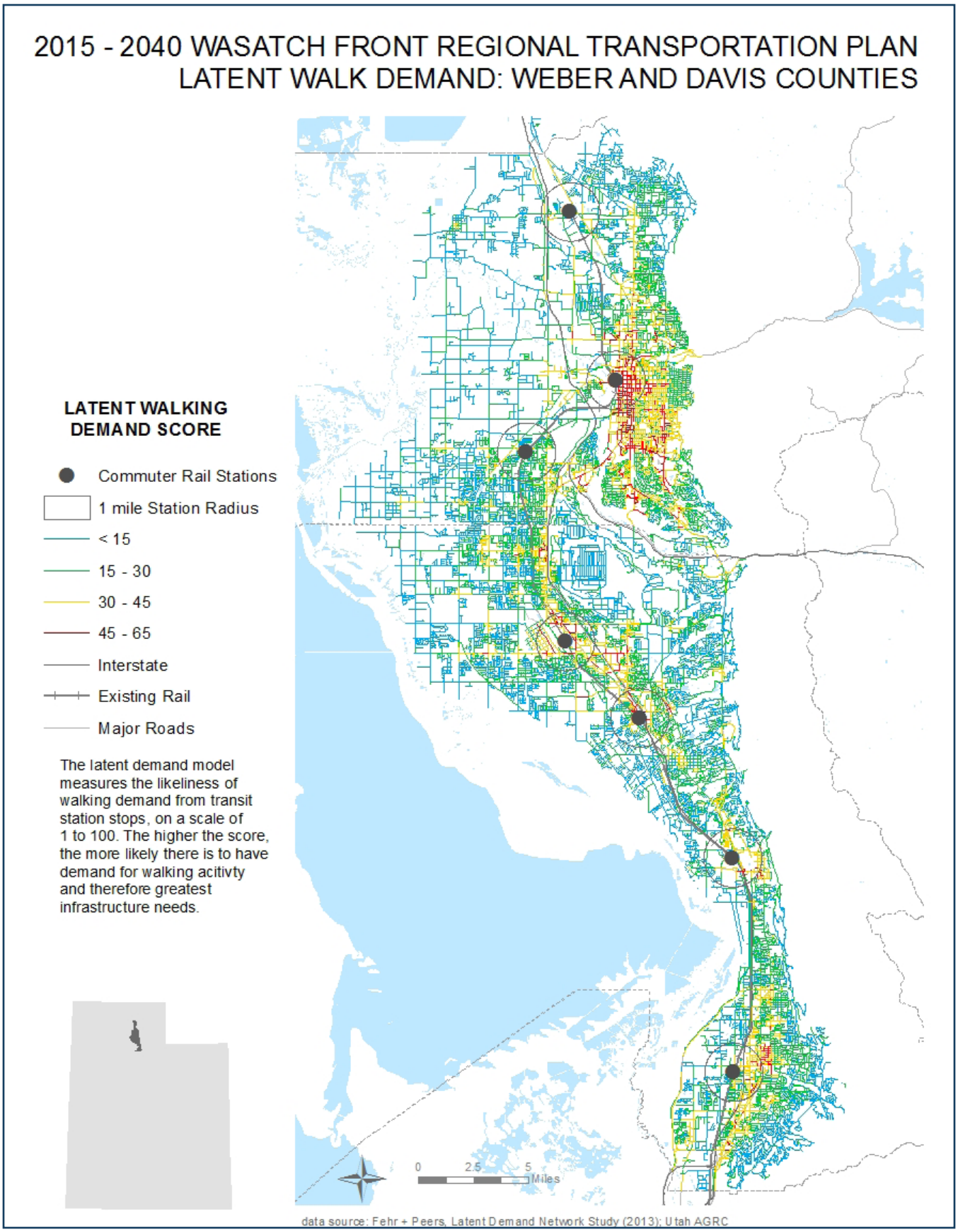
MAP 3 - 2


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
LATENT BIKE DEMAND: WEBER AND DAVIS COUNTIES
LATENT BIKING DEMAND SCORE
Commuter Rail Stations
1 mile Station Radius
< 15
15 - 30
30 - 45
45 - 65
Interstate
Existing Rail
Major Roads
The latent demand model measures the likeliness of bicycling demand from transit station stops, on a scale of 1 to 100. The higher the score, the more likely there is to have demand for biking acitivty and therefore greatest infrastructure needs.
0
2.5
5
Miles
data source: Fehr + Peers, Latent Demand Network Study (2013); Utah AGRC

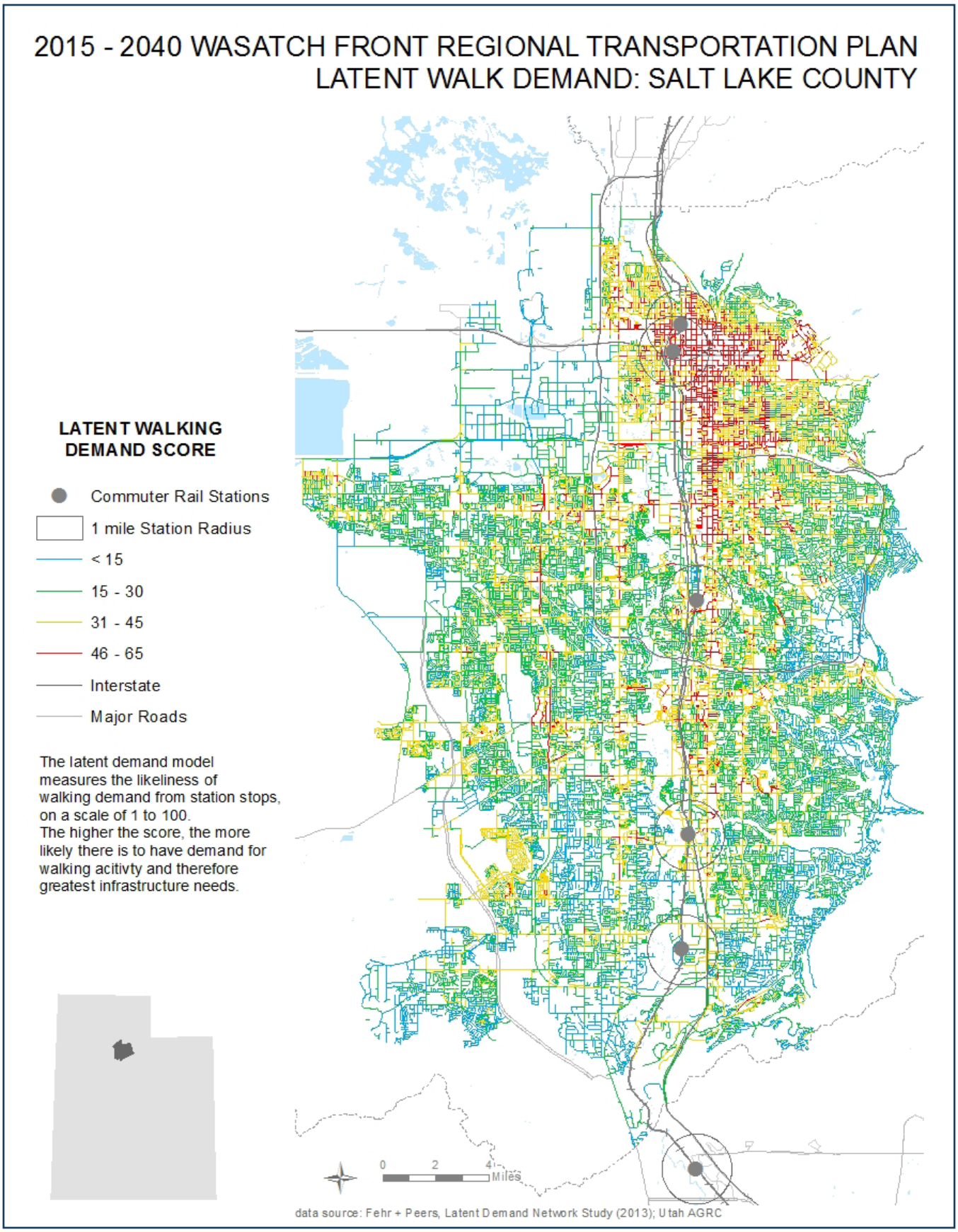
MAP 3 - 3


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
LATENT BIKE DEMAND: SALT LAKE COUNTY
LATENT BICYCLING DEMAND SCORE
Commuter Rail Stations
1 mile Station Radius
< 15
15 - 30
30 - 45
45 - 65
Major Roads
Interstate
The latent demand model measures the likeliness of bicycling demand, on a scale of 1 to 100. The higher the score, the more likely there is to have demand for bicycling and walking acitivty and therefore greatest infrastructure needs.
0
2.25
4.5 Miles
data source: Fehr + Peers, Latent Demand Network Study (2013); Utah AGRC

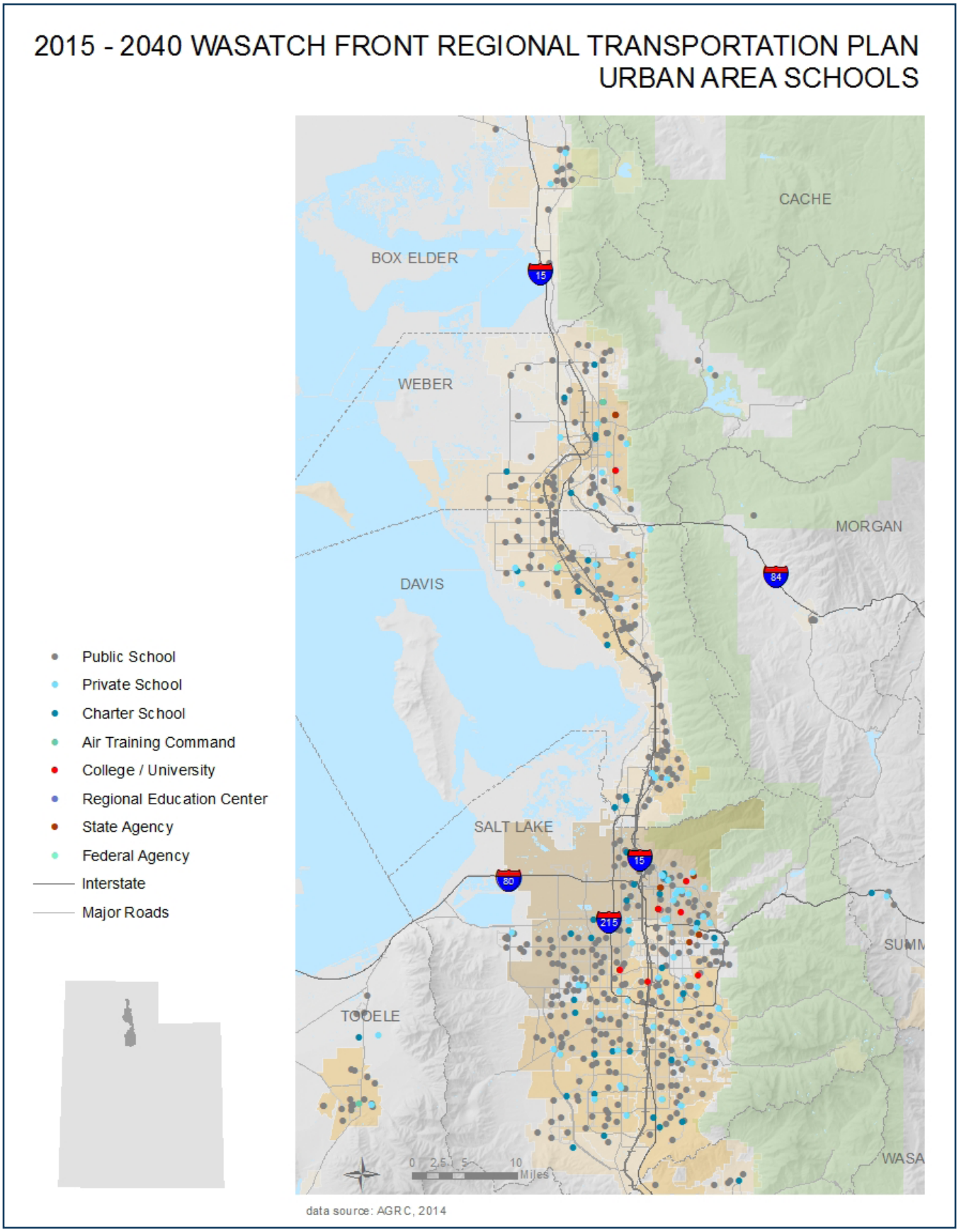
MAP 3 - 4


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
LATENT WALK DEMAND: WEBER AND DAVIS COUNTIES
LATENT WALKING DEMAND SCORE
Commuter Rail Stations
1 mile Station Radius
< 15
15 - 30
30 - 45
45 - 65
Interstate
Existing Rail
Major Roads
The latent demand model measures the likeliness of walking demand from transit station stops, on a scale of 1 to 100. The higher the score, the more likely there is to have demand for walking acitivty and therefore greatest infrastructure needs.
0
2.5
5
Miles
data source: Fehr + Peers, Latent Demand Network Study (2013); Utah AGRC

MAP 3 - 5


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
LATENT WALK DEMAND: SALT LAKE COUNTY
LATENT WALKING DEMAND SCORE
Commuter Rail Stations
1 mile Station Radius
< 15
15 - 30
31 - 45
46 - 65
Interstate
Major Roads
The latent demand model measures the likeliness of walking demand from station stops, on a scale of 1 to 100.
The higher the score, the more likely there is to have demand for walking acitivty and therefore greatest infrastructure needs.
0
2
4
Miles
data source: Fehr + Peers, Latent Demand Network Study (2013); Utah AGRC

MAP 3 - 6


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
URBAN AREA SCHOOLS
CACHE
BOX ELDER
WEBER
MORGAN
DAVIS
SALT LAKE
TOOELE
SUMM
WASA
15
84
80
215
Public School
Private School
Charter School
Air Training Command
College / University
Regional Education Center
State Agency
Federal Agency
Interstate
Major Roads
0 2.5 5 10
Miles
data source: AGRC, 2014

including staging / parking facilities and signalization

Railroads
- Improvements to allow trains to move through the urban area more rapidly and decrease their adverse impact on vehicular mobility and neighborhoods
- Railroad crossing improvements, including grade separations to increase safety

Intermodal Freight Connectivity
- Address inadequate highway capacity on SR-172 (5600 West) serving the Union Pacific intermodal facility located between SR-201 and I-80
- Grade separated crossing at SR-172 (5600 West) and the Union Pacific rail crossing at 750 South
- Improve highway access to all Salt Lake Area oil refineries and the Pioneer Pipeline terminal for both standard and longer combination (LCV) oil tank trucks
- Improve access off 900 West in South Salt Lake City to the Union Pacific automobile transload facility at Roper Yard.

AIR TRANSPORTATION NEEDS

This section shows the relationship between Regional airports to the multi-modal transportation system of the Wasatch Front Region. International, national, regional, and military airports are essential transportation facilities similar in character to the interstate highway system. Like the network of roadways, the system of airports in the Wasatch Front Region facilitates the quick and efficient movement of people and goods. **Map 3-8**, entitled, "2015 – 2040 Wasatch Front Regional Transportation Plan Airports," graphically displays the Region's airport facilities.

Airports are a key catalyst of economic activity by facilitating rapid passenger travel between distant locations. In addition to passenger travel, the air transportation system is used to move high value, time sensitive goods such as documents and technical equipment to remote locations. Airports also often play a key role in facilitating the transportation of passengers and equipment during emergency medical and natural disaster situations. Wasatch Front airports play key roles in the Utah economy and must continue to be developed and protected in order for the region to preserve its quality of life and achieve maximum economic potential. Airports must be in a position to take advantage of new technology and new facilities in order to continue to serve the air transportation and economic needs of the Region, while minimizing impacts on surrounding communities.

System Planning
Airport system planning is intended to identify current and future aviation related trends and the impact those trends could have on the Region's airports. The information also functions to bring aviation planning into congruence with other long range planning efforts. Long range system-wide planning is crucial for metropolitan airports because rapid growth and demand for services can quickly outgrow capacity. System plans assure efficient use of scarce airport resources and optimize the use of public funds. They complement individual airport plans and ensure the needs of all airport and airspace users are considered. System planning links individual airport plans, state and national airport plans, and local surface transportation plans. System planning also prevents the unnecessary duplication of facilities within the airport system by ensuring that airports with similar roles serve geographically distinct regions.

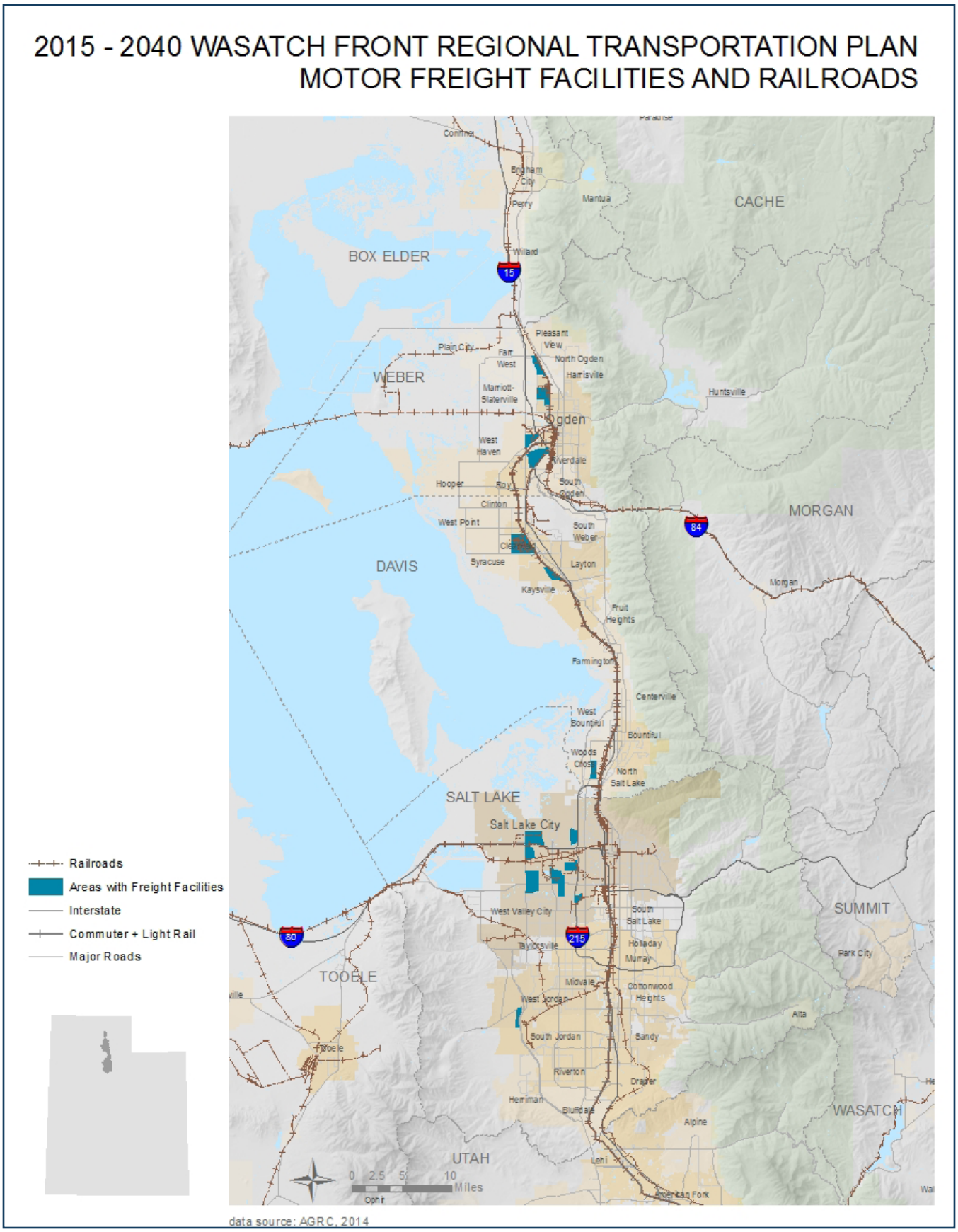
Previous System Planning Efforts

The Wasatch Front Regional Council prepared the 2003 Metropolitan Airports System Plan in accordance with the Federal Aviation Administration (FAA) Planning Grant Program. The most recent update of the statewide system plan, or the Utah Continuous Aviation System Plan (UCASP), was completed in 2007. In the UCASP, airport specific needs were assessed using a system of state-specific roles. Typically, state-specific roles are developed through consideration of many different factors including geography, demographic characteristics, economic development potential, and the demand for aviation services. A combination of these factors established what role each airport should play within the airport system, given existing and projected future demand for airport facilities. The roles established by the UCASP for the airports in the WFRC region are presented in the **Map 3-8**. For the purposes of this document, a new role, "Military," has been added for Hill Air Force Base.

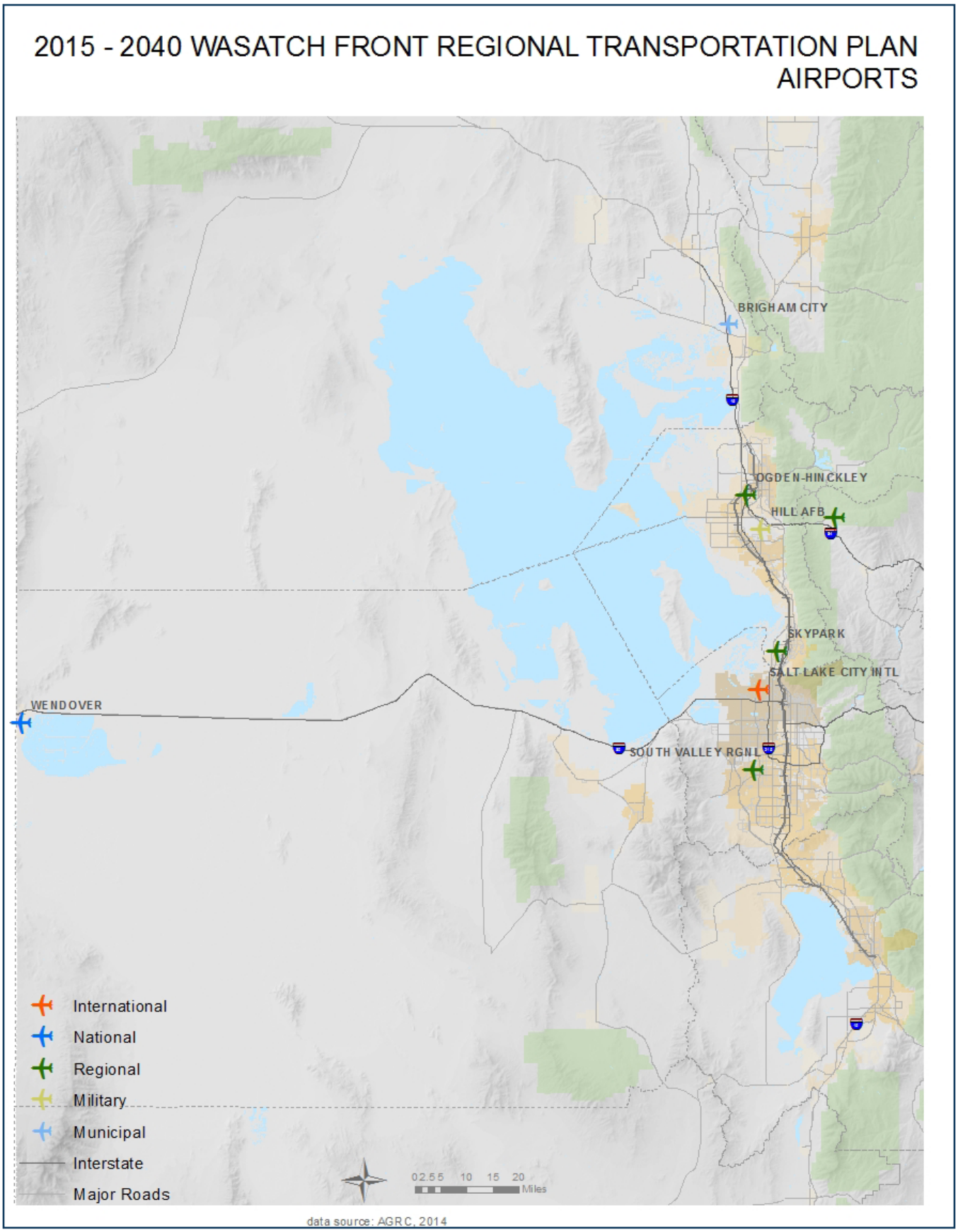
Airspace, Air Traffic Control, and Flight Operations
Proper management of the regional airspace is critical to future growth and development of airports within the region. Since the Metropolitan Area is essentially bounded by mountains, available operational airspace is limited. The controlled airspace, or Class B airspace, associated with the Salt Lake City International Airport (SLCIA) covers a substantial portion of the Region, limiting airspace available for uncontrolled visual flight rules (VFR) flying of smaller general aviation (GA) aircraft.

The FAA is in the process of implementing a new air

MAP 3 - 7


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
MOTOR FREIGHT FACILITIES AND RAILROADS
BOX ELDER
CACHE
WEBER
DAVIS
MORGAN
SALT LAKE
TOOELE
SUMMIT
WASATCH
UTAH
Ogden
Salt Lake City
Railroads
Areas with Freight Facilities
Interstate
Commuter + Light Rail
Major Roads
0 2.5 5 10
Miles
data source: AGRC, 2014

MAP 3 - 8


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
AIRPORTS
BRIGHAM CITY
OGDEN-HINCKLEY
HILL AFB
SKYPARK
SALT LAKE CITY INTL
WENDOVER
SOUTH VALLEY RGNL
International
National
Regional
Military
Municipal
Interstate
Major Roads
0 2.5 5 10 15 20
Miles
data source: AGRC, 2014

traffic control system known as "NextGen." NextGen is transforming air traffic control from a ground-based radar system to a GPS satellite-based system. This advancement is anticipated to provide significant safety, efficiency and environmental benefits to the nations' aviation system. It is anticipated that NextGen technologies and procedures will increase capacity and safety and reduce fuel burn, carbon emissions and noise by providing more efficient air routes and procedures.

Locally, the FAA is currently in the process of redesigning the Salt Lake City Class B airspace structure. This process is primarily being undertaken to fully contain and protect existing operations arriving and departing the SLCIA. The proposed changes will create additional uncontrolled airspace thereby increasing the amount of navigable airspace available for GA users operating at airports surrounding the SLCIA, particularly the South Valley Regional and Bountiful (Skypark) Airports. It is expected that these improvements will enhance safety and access to these airports while having little or no effect on airport operations in the local area.

Aviation Activity Projections

In order for the airport system to be ready to meet future demand, projections of future activity have been prepared. These projections are used to determine infrastructure needs and evaluate the ability of the airport system to accommodate the needs of the Wasatch Front Region. Demand at individual airports was analyzed using FAA based aircraft operations, aircraft data from 2009, and county population growth rate projections. National aviation forecasts are based on FAA projections and consider a 20-year horizon. These national projections indicate aviation activity will continue to grow over the long term despite previous economic downturns. Even with the numerous challenges the airline passenger industry has faced over the last ten years, the number of passenger travelers has increased and will undoubtedly continue to do so. The FAA's 20-year forecast for fiscal years 2010- 2030 predicts domestic passenger enplanements would increase by 0.5 percent in 2010, and then grow by an average of 2.5 percent per year during the remaining forecast period. The total number of operations at airports were forecasted to decreased 2.7 percent to 51.5 million in 2010, and then grow at an average annual rate of 1.5 percent reaching 69.6 million in 2030. At the nation's 35 busiest airports, operations were expected to increase 60 percent from 2010 to 2030. Locally, aviation activity within the Wasatch Front Region is expected to continue to grow more quickly than the nation as a whole. Projections of aviation activity at individual airports can be found in Appendix E, entitled "Aviation Activity By Individual Airport."

SYSTEM MANAGEMENT REVIEW

In order to maximize the life and effectiveness of transportation systems, careful management is required. Pavement management extends the life of roadways. System management preserves the capacity of roadways. Demand management improves the effectiveness of the transportation system by reducing the number of vehicle miles traveled (VMT). These three management strategies are discussed in this section.

Pavement Management

One of the Regional Growth Principles is to "provide public infrastructure that is efficient and adequately maintained." This principle is in line with UDOT's strategic goal to "preserve infrastructure." One of the best ways to accomplish these objectives is through pavement management. The Utah Department of Transportation and most municipalities and counties in the Region employ effective techniques to maintain their roadways.

Pavements represent the largest capital investment in any modern highway system. Maintaining and operating pavements on a large highway system typically involves complex decision-making process to determine how and when to resurface or apply other treatments to keep roadways performing and operating costs at a reasonable level. Traditional methods left these decisions up to a road supervisor who would select treatments based on extensive knowledge and experience. This practice is still widely used, especially in smaller communities, and works well in low-traffic areas or where repair / restoration funds are relatively unlimited. However, in most cases, this is not the situation. Rarely are there enough funds to complete all required road repairs. Secondly, high traffic volumes severely restrict when roads can be closed for maintenance. Pavement management brings more science into this process. A pavement management system consists of three major components as shown below.

- A procedure to regularly collect highway condition data
- A computer database to sort and store the collected data
- An analysis program to evaluate repair or preservation strategies and to suggest cost effective projects and timing to maintain optimal highway conditions

In most agencies, these components are combined with needs identified in the planning process and other considerations to develop annual highway repair / preservation programs.

System Management / Demand Management

Part of providing efficient public infrastructure is to ensure that unnecessary obstacles to mobility are identified and removed from the transportation system. The congruence between the Regional Growth Principles and UDOT's strategic goals is again demonstrated as the third goal is to "optimize mobility." By providing effective transit service, the Utah Transit Authority also works to achieve this goal. Fortunately, local governments within the Wasatch Front Region give vital support to both transportation system management (TSM) and transportation demand management (TDM) efforts.

Among others, transportation system management strategies include incident management, ramp metering, high occupancy vehicle / high occupancy toll (HOV / HOT) lanes, signal coordination, access management, and application of intelligent transportation system (ITS) elements. Most of these strategies are currently followed to some degree, but need to be expanded or enhanced to ensure better performance of the transportation system. Implementing such congestion mitigation measures helps preserve the original design capacity of the facility so that it can accomplish its intended purpose of moving a given volume of traffic. For example, a highway lined with a high density of heavily used driveways will experience diminished capacity due to side friction, crashes, and reduced speeds. This may lead to an apparent need for additional capacity, when in reality, if access management was in place, the roadway would function as intended.

Transportation demand management strategies include transit service in all its forms (bus, light rail, commuter rail, bus rapid transit (BRT 3), and enhanced bus (BRT 1)), ridesharing, flextime, telecommuting, pedestrian and bicycle accommodations, growth management, and congestion pricing. Most of these strategies are currently utilized in the existing transportation network. Increased implementation of these strategies is needed to provide a full range of options to the traveling public, as well as to decrease congestion levels on highways. The environmental, social, and financial consequences of only building and widening highways further point to the need to reduce the demand for single-occupant vehicle travel.

A variety of TSM and TDM strategies offer many benefits to the transportation system at a relatively low cost when compared to adding more travel lanes or other new facilities. The benefits of TSM and TDM include improved operating efficiency, preserving design capacity of existing facilities, increased safety, reduced energy consumption, and reduced emissions. These benefits stem from the improved operation of existing facilities when TSM strategies are implemented and from the reduction in vehicle trips as TDM strategies are applied.

Intelligent Transportation Systems

"Non-recurring" congestion, such as that caused by vehicular crashes, highway construction, or weather conditions, has been estimated to account for around 50 percent of traffic congestion in the Wasatch Front Region. Intelligent transportation systems (ITS) are a vital tool to manage the effects of non-recurring congestion. One element of these systems includes dynamic message signs to alert motorists of incidents on the road ahead so that they can take an alternate route. Communications systems to speedily alert emergency management providers, traffic control centers, dispatch, incident management personnel, the media, and others about incidents are also part of ITS. Detectors and cameras further aid in verifying and managing these incidents. The ability to implement pre-packaged signal timing plans to respond to traffic changes resulting from incidents is another aspect of ITS.

ITS can also be used to better manage recurring congestion, associated with weekday peak commuting times. This is accomplished through means such as signal timing plans on arterial streets and ramp metering to improve freeway traffic flow. Coordinating signals can reduce delays by 20 to 30 percent. Ramp metering also has significant effects in decreasing delay.

Another way in which ITS addresses both non-recurring and recurring highway congestion is by improving the efficiency and convenience of the transit system, thus increasing ridership and reducing single-occupant vehicle travel. Riders can be notified in "real-time" of bus and rail travel schedules and connecting transit service through electronic signs, the internet, phone systems, and other means. The transit fleet can be better managed in response to changing traffic conditions. Voice enunciators and "smart card" payment systems are also part of transit ITS.

If ITS applications are to be expanded in the Wasatch Front Region, more funding is needed. The majority of the existing system was funded as part of the major reconstruction of I-15 in Salt Lake County during the late 1990s. Original equipment is quickly becoming obsolete, reducing the potential effectiveness of the system.

Consequently, a priority need for ITS is to maintain and update the existing systems already implemented in the Region. Without a continued effort to update signal timing plans and to keep equipment working, the ability to effectively move people on the transportation system by providing readily available information will suffer. A key component of these systems is the ability to disseminate both real-time and historical travel time information and other relevant highway and transit facts. The need to continue to improve and expand these capabilities will persist. As discussed above, there is a great need to reduce travel demand, and ITS improvements implemented in the transit system play an important role in meeting this need.

Congestion Pricing

The largest traffic volumes are found on freeways. The need to manage freeways is vital because their ability to move traffic is dramatically reduced as volumes approach capacity and speeds plummet. Congestion pricing on freeways prevents speeds from dropping by increasing the cost to the traveler to use the facility. If fully implemented, congestion pricing will increase the cost to use the facilities, based on congestion during peak periods. In order for businesses to prosper and the regional economy to be sustained, impediments to freeway travel must be minimized. Congestion pricing can be an effective tool for addressing this need. Other facilities or locations can also benefit from congestion pricing. For example, establishing fees for single-occupancy vehicular travel in central business districts has proven effective for managing traffic in some large cities.

PUBLIC INPUT ON TRANSPORTATION NEEDS

A critical element of needs assessment for the RTP is public involvement/engagement. Over the four years of the RTP update process, thousands of public comments on the draft plan were received and documented. These comments were then carefully considered by the WFRC planning staff resulting in adjustments to the draft RTP in many instances.

In order to solicit and receive the many public comments on the draft RTP noted above, the Regional Council has maintained a robust public outreach and involvement process including participation in dozens of open houses including 9 sponsored by WFRC, specific mention of the Regional Council in hundreds of news stories, 36 small area meetings for city mayors and other local officials to weigh in on the draft RTP during its various stages of development, 7 newsletters sent to the WFRC master mailing list of over 3,200 recipients, a new, professionally produced website including an interactive map for the draft RTP, 22 visits to environmental justice groups to ascertain their needs, 29 visits to other special interest groups, 6 consortium meetings with over 350 participants each, a strong social media presence, several visits with other government agencies including those focused on natural resources, the local transit workers union and many other activities to engender public input to the draft RTP. More complete summaries of Regional Council public involvement/engagement efforts are included in the Overview and in Appendix C, entitled "Public Involvement And Comment Summary."

SAFETY NEEDS

The Utah Department of Transportation collected data on highway crashes from 2009-2011 and reported this in the form of a "safety index." The index considers the severity of the crash and highlights those areas that have a higher rate of crashes into a single numeric value. The safety index provides a starting point for identifying where safety improvements are needed. The safety index for the Wasatch Front area is shown as **Map 3-9**. The needs analysis emphasizes highway segments with a safety index ranging from 7.0-10.0 are shown in black and a visual inspection focusing on these segments reveals some interesting patterns about highway safety. In general, higher volume arterial facilities with unrestricted access tend to have the highest safety Index. This is to be expected because these facilities have the most conflict points with at-grade intersections and unrestricted commercial and residential access along the route. Conflict points increase even more where arterials streets access freeway interchanges. While freeways, in general, tend to be safer facilities, arterial streets at the interchanges tend to have a higher safety index than other portions of the arterial. For an explanation of safety needs analysis, refer to Appendix F, entitled "Safety Index Calculations."

A few freeway segments also display a number of black segments denoting a high safety index. These freeway locations are I-215/Legacy Parkway interchange, SR-201 near 7200 West, and I-15 south of 5400 South. The Utah Department of Transportation has already remedied some safety concerns with the vertical profile of I-215 and Legacy Parkway as the road transitions to the grade of several bridge structures. Another potential

MAP 3 - 9

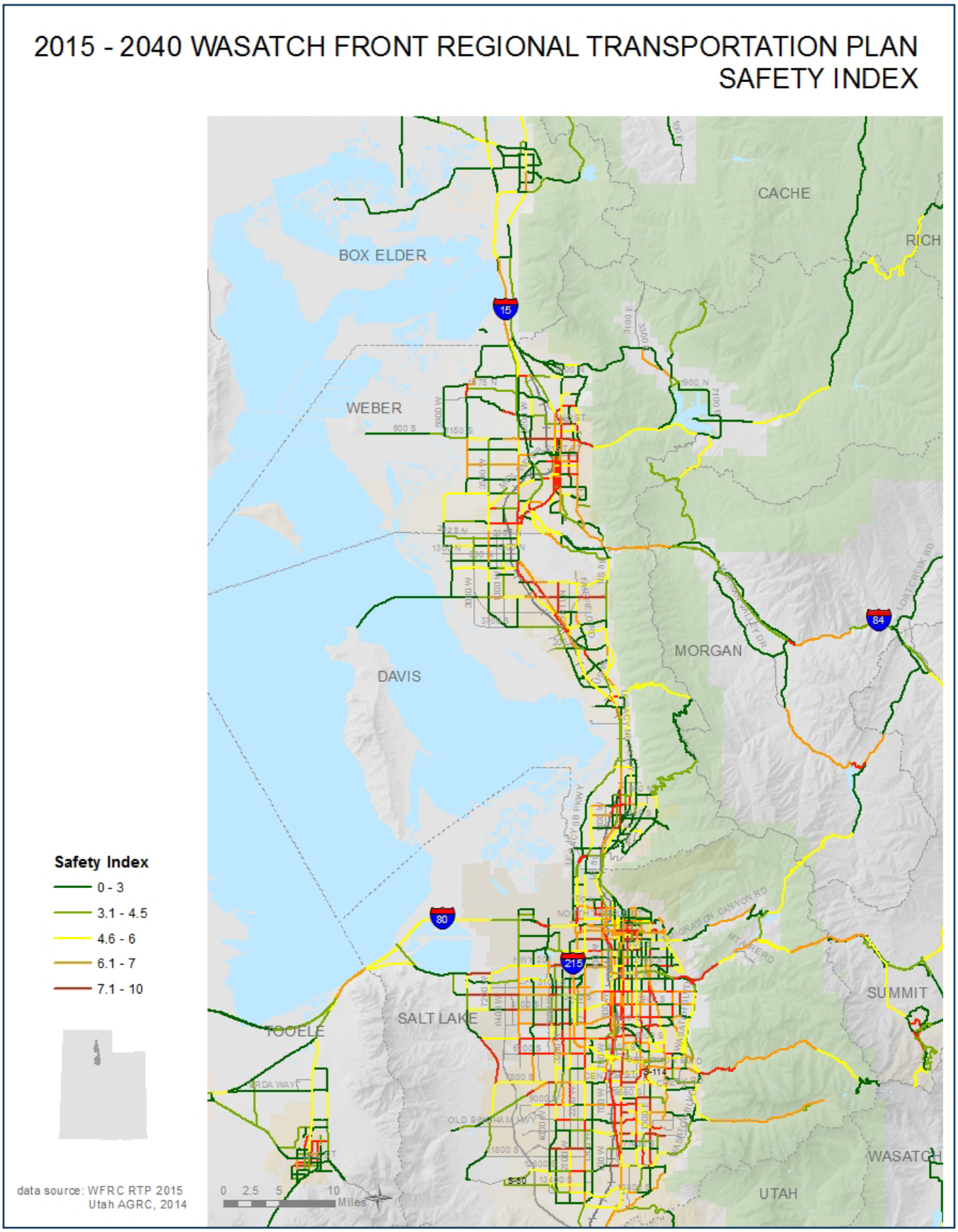

2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
SAFETY INDEX
BOX ELDER
CACHE
RICH
WEBER
DAVIS
MORGAN
SALT LAKE
TOOELE
SUMMIT
WASATCH
UTAH
15
80
84
215
Safety Index
0 - 3
3.1 - 4.5
4.6 - 6
6.1 - 7
7.1 - 10
data source: WFRC RTP 2015
Utah AGRC, 2014
0 2.5 5 10
Miles

FIGURE 3 - 3 UTAH HIGHWAY CRASH RATE PER MILLION VEHICLES

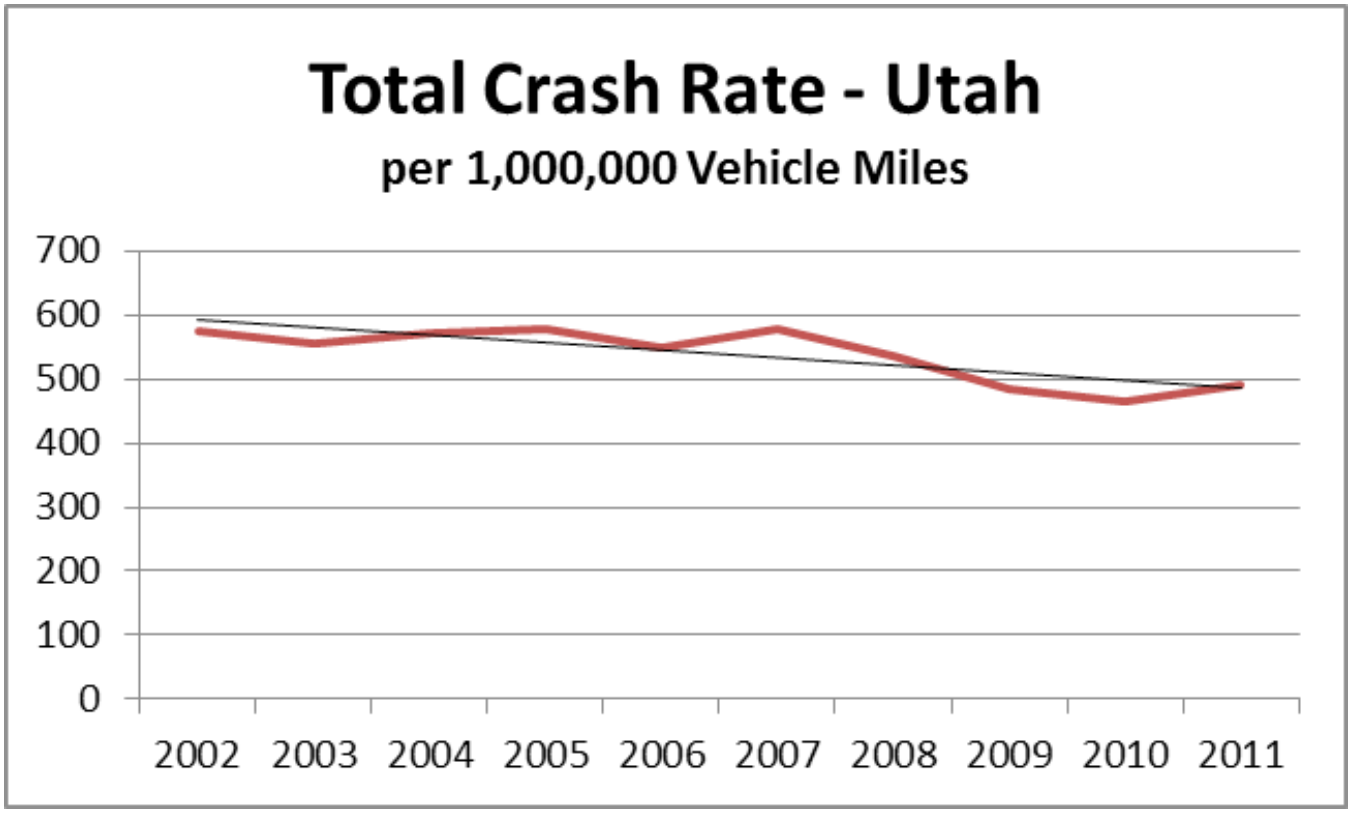


FIGURE 3 - 4 UTAH HIGHWAY TOTAL CRASHES BY YEAR

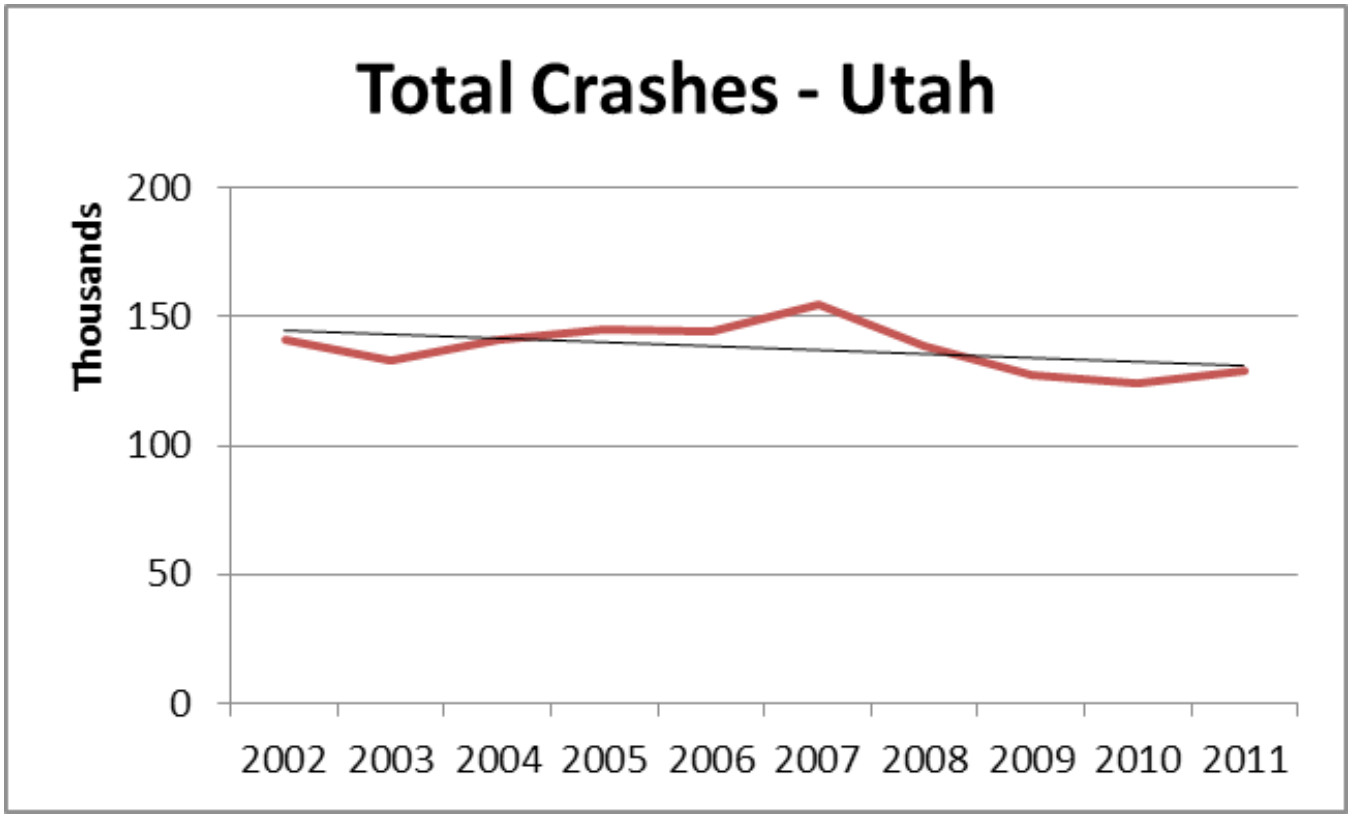
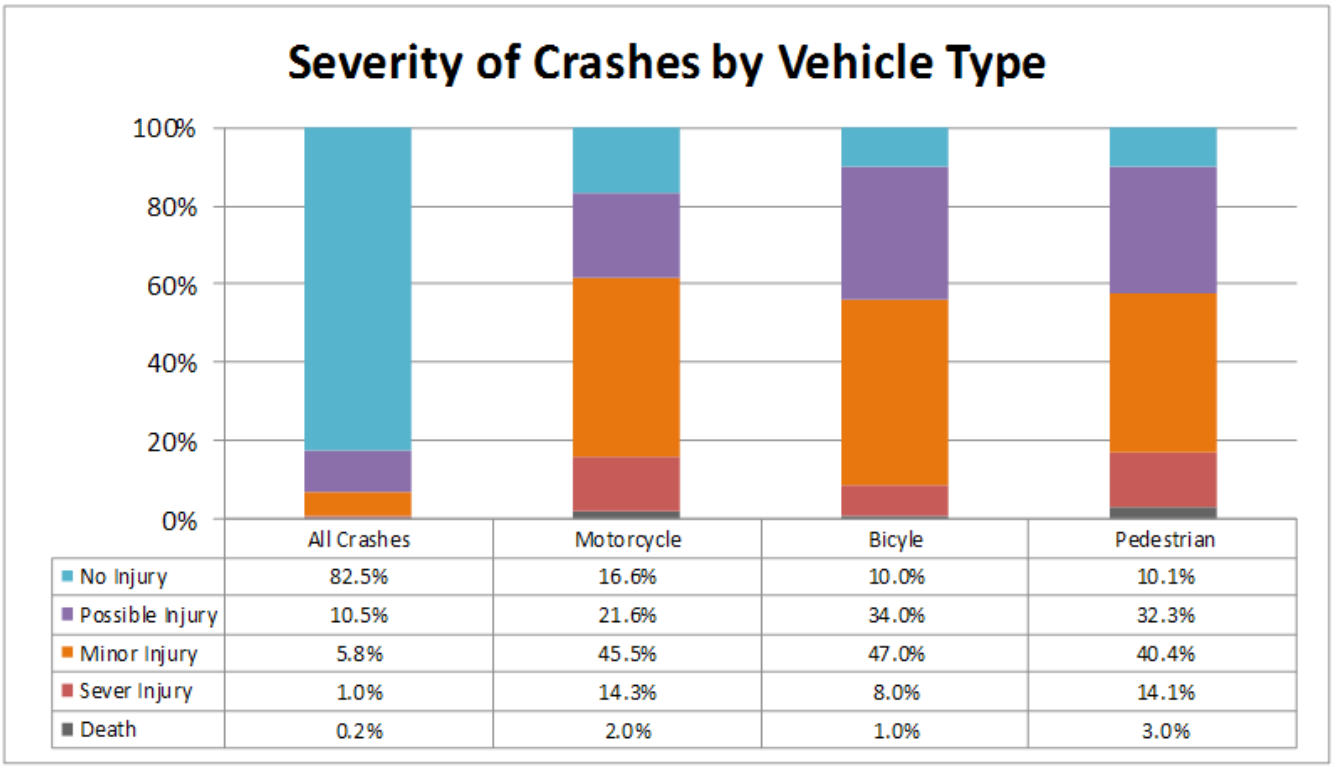


FIGURE 3 - 5 UTAH SEVERITY OF CRASHES BY VEHICLE TYPE



	All Crashes	Motorcycle	Bicyle	Pedestrian
No Injury	82.5%	16.6%	10.0%	10.1%
Possible Injury	10.5%	21.6%	34.0%	32.3%
Minor Injury	5.8%	45.5%	47.0%	40.4%
Sever Injury	1.0%	14.3%	8.0%	14.1%
Death	0.2%	2.0%	1.0%	3.0%

FIGURE 3 - 6 BICYCLE MOTOR VEHICLE CRASHES

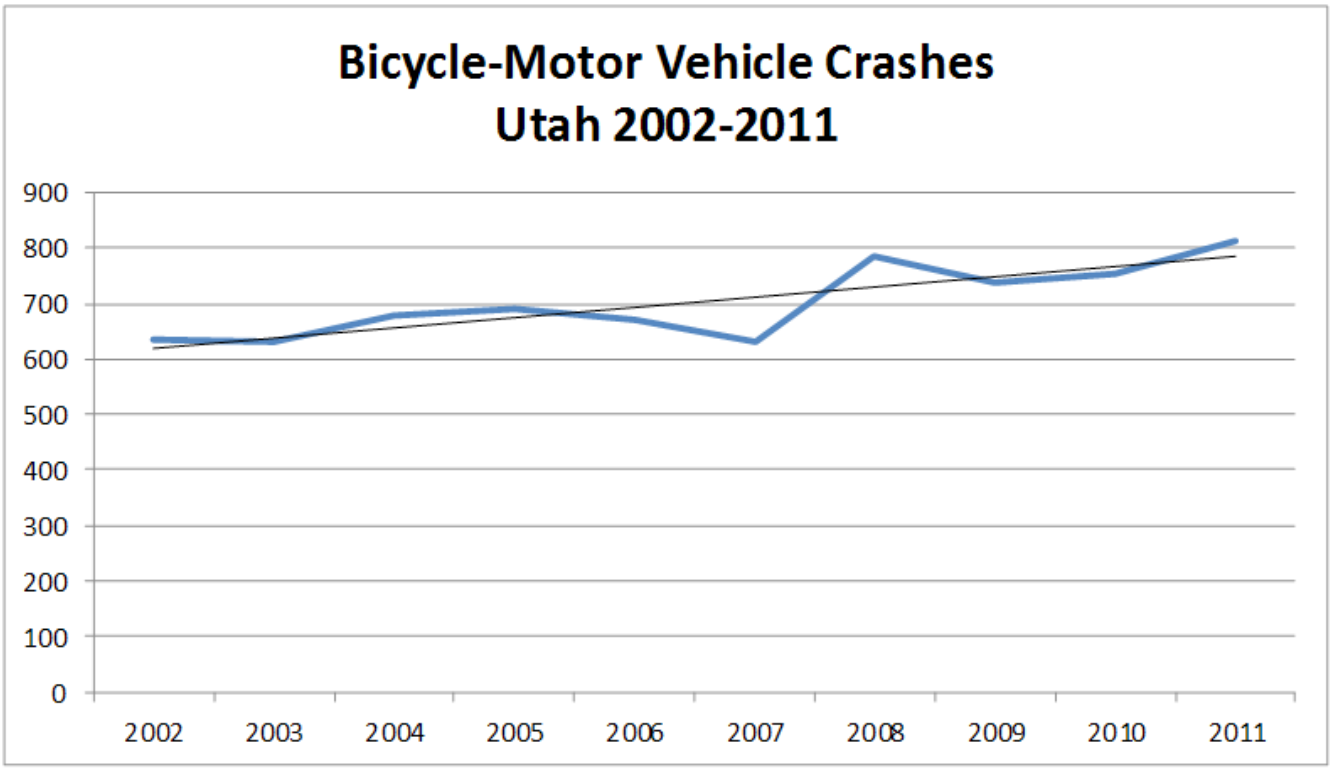
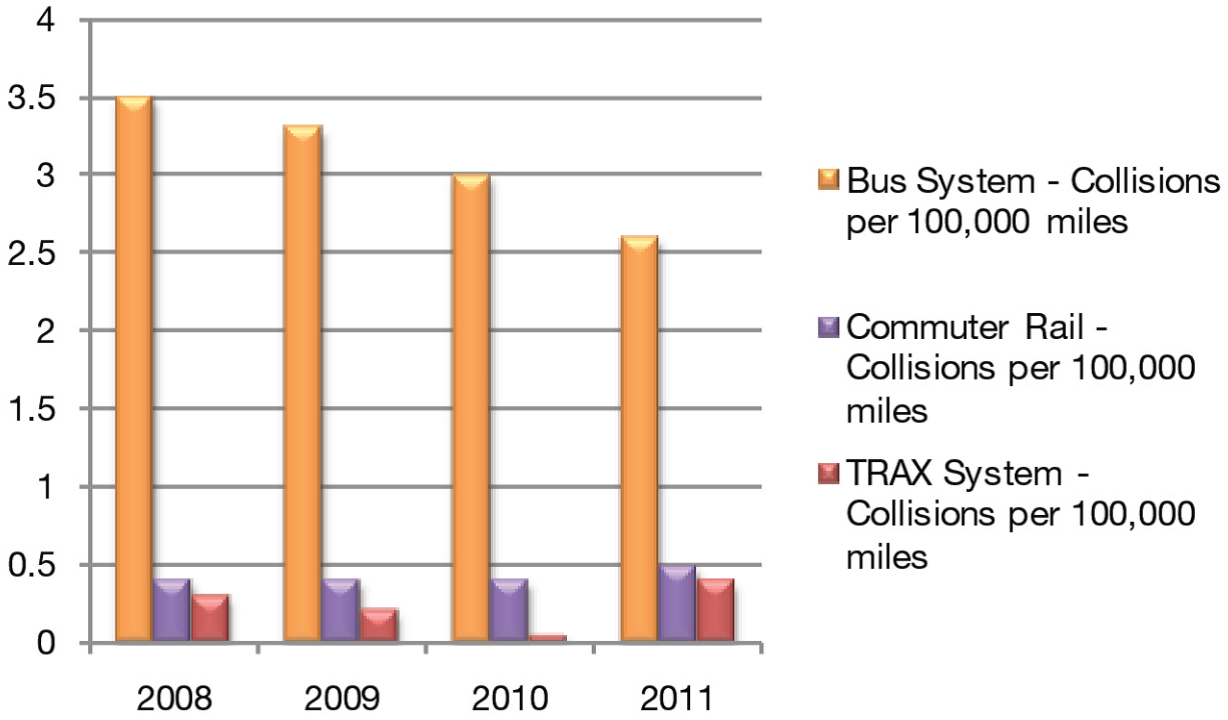


FIGURE 3 - 7 UTA SYSTEM COLLISIONS PER 10,000 MILES



issue in this area is the amount of storage for the I-215 northbound off-ramp to Redwood Road. The SR-201 facility transitions from a grade separated facility to an at-grade facility in the vicinity of 7200 West. SR-201 also has some elevated safety index scores between the interchanges with Bangerter Highway and I-215. The Utah Department of Transportation has already begun a project to upgrade the SR-201 facility in this area. The third freeway area to highlight for safety concerns is I-15 in Salt Lake County in various sections south of 5300 South due to high volumes and numerous weaving sections.

Figure 3-3 shows the trend of highway crashes per million vehicle miles, or crash rate, for the State of Utah from 2002-2011. Traffic officials are encouraged that the crash rate is on a declining trend. What is also encouraging is that the total number of crashes, as shown in **Figure 3-4** is also declining over the same time period even though the vehicle miles traveled has been increasing.

Another safety factor is the severity of injuries to crash victims. An examination of injury severity by mode of travel highlights some stark, but not unexpected, comparisons. For crash victims afforded some protection while riding in a vehicle, about 93 percent will likely walk away with no reported injuries. But for unprotected crash victims traveling on foot, bicycle, or motorcycle only 32-38% will be injury free. With the increase in bicycle travel for recreation and employment, the increase in pedestrians accessing transit service, and the increase in motorcycle use (in some cases as a response to rising fuel prices), there is concern that the increased exposure of this vulnerable group of travelers can lead to an increase in injuries and fatalities. **Figure 3-5** shows the severity of crashes by vehicle type.

Figure 3-6 bears out this trend for crashes involving bicycles from 2002- 2011. Separate bicycle facilities, improved markings for bike lanes, and improved vehicle operator awareness are a few measures that can help to mitigate the rise in bicycle fatalities. However, as the number of bicycles increases in the traffic mix, none of these mitigating measures or changing the laws of the road can change the laws of physics. All parties involved need to strive for a safer traveling environment. While vehicle operators bear most of the legal responsibility to watch for pedestrians, cyclists, and motorcycles, travelers of these unprotected modes need to be vigilant and recognize that they are less visible to vehicle operators due primarily to their size and that they can appear in the traffic stream at locations not expected.

Safety needs are also considered in planning the public transit system. Safety is UTA's highest priority. UTA is committed to ensure that facilities, vehicles, and job sites

are safe, free from hazards that contribute to accidents and injuries. The Utah Transit Authority is also conscious of the need to maintain safe working conditions. In 2011/2012, UTA undertook numerous efforts to improve safety around the transit system. A new chief safety officer was appointed and the number of rail safety administrators in the company doubled. Moreover, new pedestrian treatments and standards were set and are now being installed on new lines. Safety education opportunities and requirements for UTA employees have been increased; and safety infractions more strictly sanctioned.

In 2011, as shown in **Figure 3-7**, collisions on the UTA bus system decreased by 13 percent, while commuter rail collisions increased slightly to 0.5 collisions per 100,000 miles. From 2010 to 2011, light rail collisions increased from 0.1 to 0.4 collisions per 100,000 miles. This increase was due in part to the opening of 15.2 new miles on two TRAX lines, increasing not only service levels and ridership, but risk and exposure.

HOMELAND SECURITY NEEDS

The Wasatch Front Region is often times referred to as the "Crossroads of the West". Because the Rocky Mountains bisect the entire western portion of the United States (north-south), there are only five interstate facilities that allow east-west travel across this portion of the country. Of those facilities, I-80 is the most centrally located running through Salt Lake City and connecting New York- Chicago- Omaha- Salt Lake and San Francisco. Similarly, I-15 is one of only three north-south interstate facilities west of the Mississippi River, which extends to the northern and southern borders of the United States. Designated the Canadian- Mexican (CanaMex) Transportation Corridor, I-15's regional impacts along the Wasatch Front are ever increasing. Paralleling the Rocky Mountains, it too passes through the Wasatch Front Region intersecting I-80 in the Salt Lake Valley.

The aviation and railroad systems experience a convergence equivalent to that of the interstate highways. The Trans-Continental Railroad continues to be the major east-west rail connection across the United States. Aviation, like rail, targets a specific transportation market and has considerable influence on the Inter-Mountain Region. The Salt Lake City International Airport is a major hub for Delta Airlines and cargo airlines. It serves a major portion of the Intermountain West, in as much as the next closest major commercial service airport is over 300 miles away.

In developing a regional transportation plan, the distinctive topography of the Region must be taken into account. I-15, I-80 and I-84 all enter and exit the Region through narrow corridors constrained by the natural topography. On the northern end of the Region, the I-15 transportation corridor narrows to less than one mile. This condition also occurs in the city of Centerville, in Davis County, and at the southern border of Salt Lake County. All three of these constrained locations include I-15, railroad lines (freight and passenger), a power corridor, frontage road(s) and one or two parallel arterials. The east-west corridors are similarly constrained by high mountain passes and the Great Salt Lake. Weber Canyon is located in eastern Weber County. At 400 feet wide it is constrained by rock cliffs and the Weber River, and is the route of I-84 and a railroad corridor. To the east in Salt Lake County is Parley's Canyon, which narrows to 200 feet wide, constrained by cliffs and is the route of I-80. At Lake Point Junction on the western edge of Salt Lake County the corridor, constrained by the Oquirrh Mountains and the Great Salt Lake is just one-quarter mile wide and contains I-80, a railroad corridor, a power corridor and a frontage road.

The distinctive regional topography constraining the transportation network has a conspicuous impact on the entire Wasatch Front Region in the form of natural hazards. Potential hazards include earthquakes, landslides, wildfires, dam failures, flood and severe weather. With a prominent geological fault paralleling the foothills of the Wasatch Mountains throughout the Region and extending through the Great Salt Lake and into north-central Salt Lake County, the effects of an earthquake or other natural disasters including severe weather condition on the transportation system must also be taken into consideration.

The air corridors are also severely restricted as access to the Salt Lake International Airport is limited to north-south approaches. These approaches are further impacted by the confined air space bounded by mountains on the east and west. The restrictive natural topography or "pinch points" affecting surface transportation in all cardinal directions from Salt Lake City and the availability of limited air space are the basis of the need for more redundancy within the transportation system throughout the Region.

In considering the convergence of two interstate highways, the Transcontinental Railroad and an international airport along the Wasatch Front, it becomes very evident that the regional transportation facilities have national significance. This importance is further increased when consideration is given to the physical

constraints of the topography and potential for natural disasters. These conditions quickly raise awareness and concerns about the possible impact disruptions in the Region's transportation systems could have not only on local and regional populations but the national transportation industry and security interests as well.

The national significance of this "Crossroads of the West," geographic notion, coupled with restrictive topography, potential for natural disasters and demonstrated need for additional regional transportation facilities to serve increasing regional travel demands. It bolsters the rationale for long range transportation planning, adding new capacity and improvement of current facilities, and elimination of choke points in transportation corridors. In order to effectively address regional security needs, a concerted effort must continue at all levels of government and industry within the Wasatch Front Region to develop an awareness of the potential dangers that exist to transportation systems. A consensus must be reached on what elements of security incident prevention and mitigation, including consideration and implementation of specific projects, strategies, and services will best address the security needs of the transportation system for motorized and non-motorized users. Well defined and agreed upon strategies should be incorporated into the state and metropolitan area's transportation planning processes.

Regional security goals at the metropolitan planning level are based, in-part, on improved communication and coordination between the increasing number of agencies involved with security and emergency preparedness. As a component of the coordination effort, several plans should be considered for review and update. These plans include but are not limited to a public transit emergency management operations and recovery plan; a fuel shortage plan; and emergency operations plans at local, regional and state levels. Conducting simulations and exercising these plans is needed to determine their operational benefits and shortfalls.

At the operational level, intelligent transportation systems should be improved to facilitate the expansion and responsiveness of the UDOT Traffic Operations Center (TOC) and the UTA Dispatch Operations. These major components would help to preserve the reliability, robustness, and resiliency of the transportation infrastructure system and to maintain essential services needed to preserve confidence in the transportation system in the event of a man caused or natural disaster.

CREATE AND EVALUATE SCENARIOS

Develop land use and transportation planning scenarios that explore how transportation and development patterns affect each other. Explore how these address transportation needs, and their overall impacts on quality of life. Gather input and ideas on these scenarios from local stakeholders and the public to develop a preferred scenario.

INTRODUCTION

Based on current population growth, the Wasatch Front can expect well over 1 million people will be added to our Region's population by 2040. Much must be done to prepare for this growth. What will it mean for transportation, housing, employment, and how do we maintain our high quality of life?

To consider how best to plan for growth and explore how it might unfold in our Region, the WFRC and its member local governments came together to explore a range of different potential futures or growth scenarios. There are excellent reasons to start a regional transportation plan based on scenarios. One reason is that planners do not know how this growth will unfold. Exploring a variety of plausible future outcomes helps us plan for an uncertain future. Scenarios are also a means to help explore how potential transportation decisions affect, are affected by, and ultimately serve different development patterns. When a road or rail line is built, it affects where people want to live and work, and thus the location of new development. In addition, when a community grows more in one area than another, more people will travel to that location, and growth can change what transportation solutions are needed. Overall, growth scenarios are important tools that can be used to explore the interplay between transportation and land use as Regional officials and those they serve consider how best to accommodate transportation needs over the coming decades. Lastly, exploring how transportation and land use decisions might be coordinated- with an eye toward long-term impacts on the quality of life- helps decision-makers understand what plans need to put in place today to maintain our Region's high quality of life.

OVERVIEW OF FOUR SCENARIOS

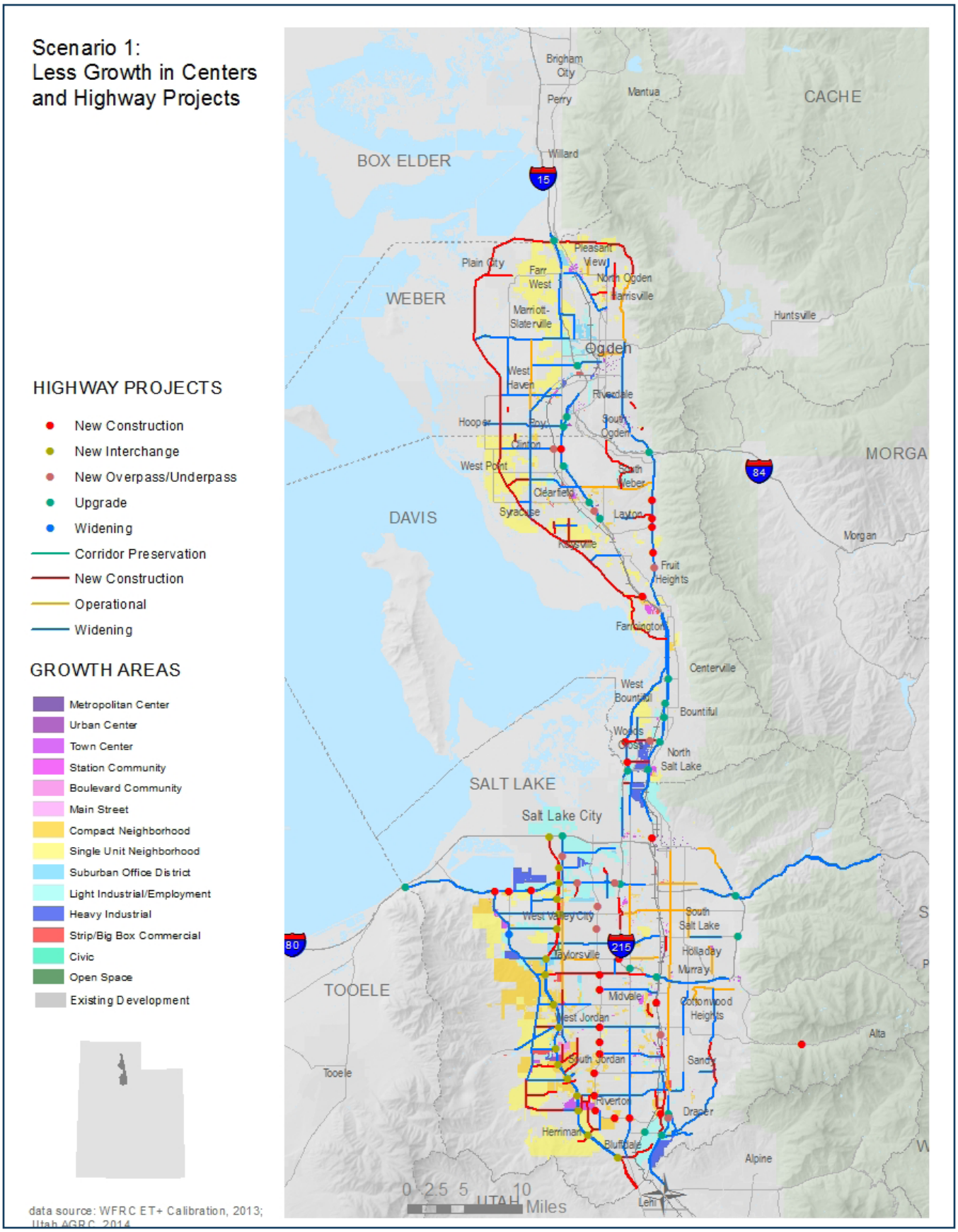
The transportation planning process takes place within the context of the Region's shared Wasatch Choice for 2040 Vision. This Vision was developed through a broad grassroots process that began in 2005 with input and direction from over 1,000 residents from Weber, Davis, Salt Lake, and Utah Counties. This visioning process explored how growth and transportation might work together to in order to maximize the investment in transportation facilities. A key ingredient of the Wasatch Choice for 2040 Vision is providing multiple incentives to encourage robust growth centered in such areas as central business districts, main streets, and major office parks, especially when centers are coordinated with light rail, commuter rail, highways, and major arterial streets. Centers near intersections of major transportation facilities help people get to more destinations in less time.

The 2015 – 2040 RTP scenarios represent a range of land use and transportation combinations explored within the context of the Wasatch Choice for 2040 Vision. In general terms, the scenarios can be described as follows:

- Scenario 1 is less dependent on the centers concept than the currently adopted 2011-2040 RTP;
- Scenario 2 is consistent with the 2011 – 2040 RTP;
- Scenario 3 is more centered than 2; and
- Scenario 4 is the most centered of all the scenarios.

How much growth which happens in identified centers is the most notable differences among the four scenarios. It is important to note that each scenario was developed using the same number of people, jobs, and the general amount of money spent on regional transportation. As stakeholders decided which scenario they prefer, they were able to distinguish their relative advantages and disadvantages not to the amount of money or amount of growth, but rather to how transportation and development patterns unfold together. **Maps 4-1 through 4-8** show the four scenarios. Each of the fours scenarios are broken out by their individual highway and transit projects.

MAP 4 - 1


Scenario 1:
Less Growth in Centers
and Highway Projects
HIGHWAY PROJECTS
New Construction
New Interchange
New Overpass/Underpass
Upgrade
Widening
Corridor Preservation
New Construction
Operational
Widening
GROWTH AREAS
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
Main Street
Compact Neighborhood
Single Unit Neighborhood
Suburban Office District
Light Industrial/Employment
Heavy Industrial
Strip/Big Box Commercial
Civic
Open Space
Existing Development
data source: WFRC ET+ Calibration, 2013;
Utah AGRC, 2014
BOX ELDER
CACHE
WEBER
DAVIS
SALT LAKE
TOOELE
MORGA
Brigham City
Perry
Mantua
Willard
Plain City
Farr West
North Ogden
Harrisville
Marriott-Slaterville
Huntsville
Ogden
West Haven
Riverdale
Hooper
Roy
South Ogden
Clinton
West Point
South Weber
Clearfield
Syracuse
Layton
Kaysville
Fruit Heights
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
Salt Lake City
West Valley City
South Salt Lake
Taylorsville
Holladay
Murray
Midvale
Cottonwood Heights
West Jordan
South Jordan
Sandy
Riverton
Draper
Herriman
Bluffdale
Alpine
Alta
Tooele
Lehi
Morgan
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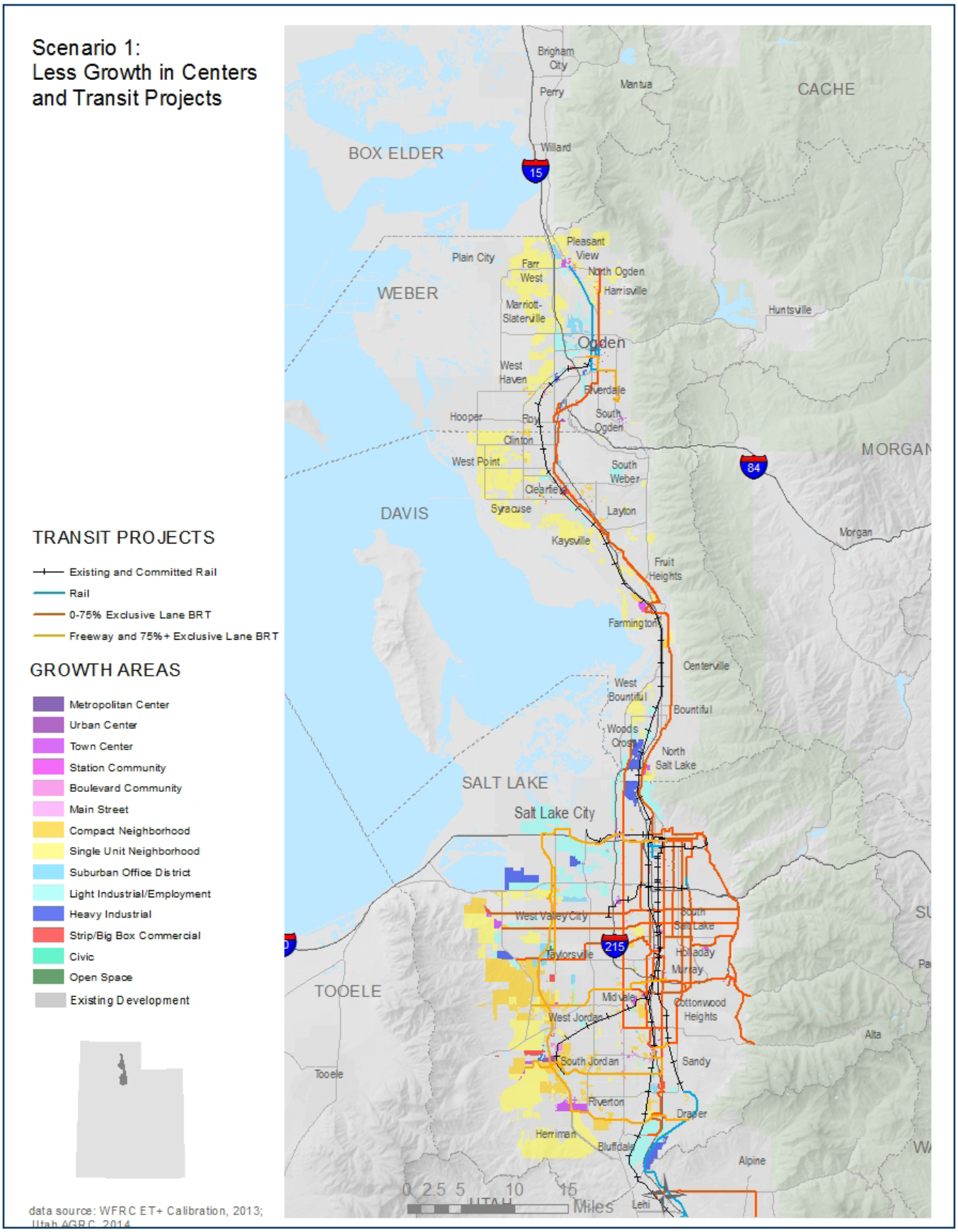
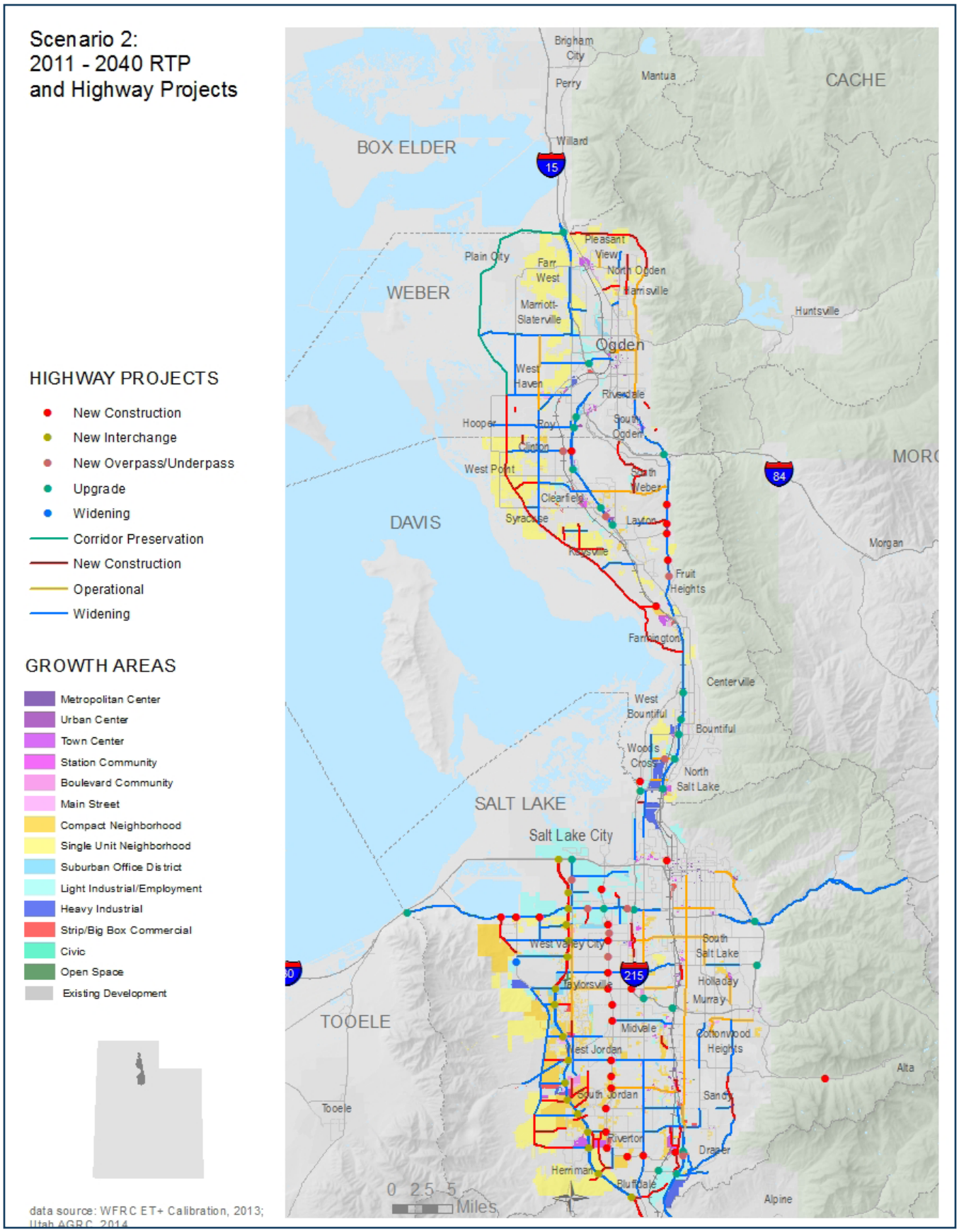
0 2.5 5 10
Miles

MAP 4 - 2


Scenario 1:
Less Growth in Centers
and Transit Projects
TRANSIT PROJECTS
Existing and Committed Rail
Rail
0-75% Exclusive Lane BRT
Freeway and 75%+ Exclusive Lane BRT
GROWTH AREAS
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
Main Street
Compact Neighborhood
Single Unit Neighborhood
Suburban Office District
Light Industrial/Employment
Heavy Industrial
Strip/Big Box Commercial
Civic
Open Space
Existing Development
data source: WFRC ET+ Calibration, 2013;
Utah AGRC, 2014
0 2.5 5 10 15
Miles
BOX ELDER
CACHE
WEBER
DAVIS
SALT LAKE
TOOELE
MORGAN
Brigham City
Perry
Mantua
Willard
Pleasant View
Plain City
Farr West
North Ogden
Harrisville
Marriott-Slaterville
Huntsville
Ogden
West Haven
Riverdale
Hooper
Roy
South Ogden
Clinton
West Point
South Weber
Clearfield
Syracuse
Layton
Kaysville
Morgan
Fruit Heights
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
Salt Lake City
West Valley City
South Salt Lake
Taylorsville
Holladay
Murray
Midvale
Cottonwood Heights
West Jordan
Alta
South Jordan
Sandy
Tooele
Riverton
Draper
Herriman
Bluffdale
Alpine
Lehi
15
84
215

MAP 4 - 3


Scenario 2:
2011 - 2040 RTP
and Highway Projects
HIGHWAY PROJECTS
New Construction
New Interchange
New Overpass/Underpass
Upgrade
Widening
Corridor Preservation
New Construction
Operational
Widening
GROWTH AREAS
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
Main Street
Compact Neighborhood
Single Unit Neighborhood
Suburban Office District
Light Industrial/Employment
Heavy Industrial
Strip/Big Box Commercial
Civic
Open Space
Existing Development
data source: WFRC ET+ Calibration, 2013;
Utah AGRC, 2014
Brigham City
Perry
Mantua
CACHE
BOX ELDER
Willard
15
Pleasant View
Plain City
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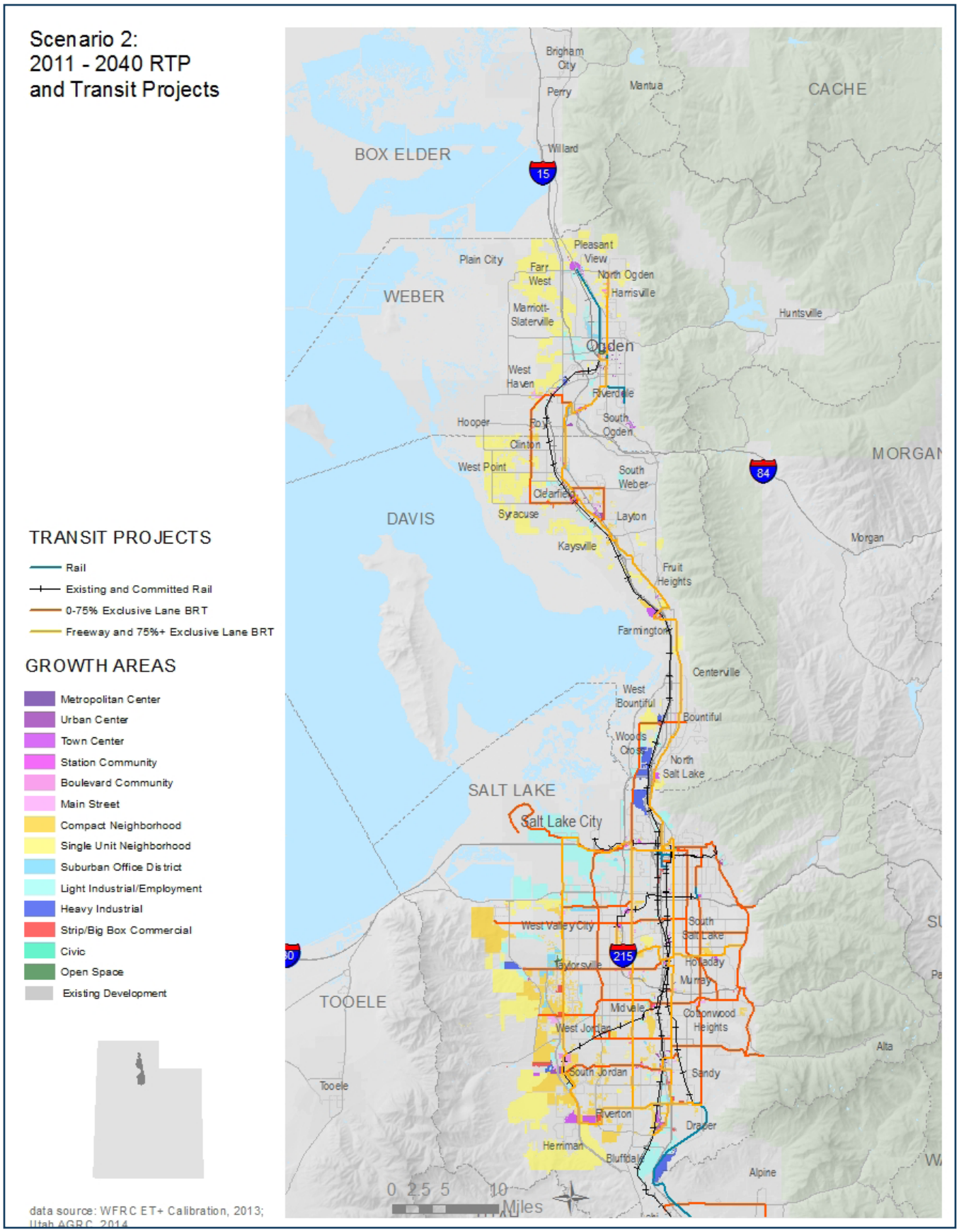
Harrisville
WEBER
Marriott-Slaterville
Huntsville
Ogden
West Haven
Riverdale
Hooper
Roy
South Ogden
Clinton
West Point
South Weber
84
Clearfield
Syracuse
DAVIS
Layton
Kaysville
Morgan
Fruit Heights
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
SALT LAKE
Salt Lake City
West Valley City
South Salt Lake
215
Taylorsville
Holladay
Murray
TOOELE
Midvale
Cottonwood Heights
West Jordan
Alta
South Jordan
Sandy
Tooele
Riverton
Draper
Herriman
Bluffdale
Alpine
0 2.5 5
Miles

MAP 4 - 4


Scenario 2:
2011 - 2040 RTP
and Transit Projects
TRANSIT PROJECTS
Rail
Existing and Committed Rail
0-75% Exclusive Lane BRT
Freeway and 75%+ Exclusive Lane BRT
GROWTH AREAS
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
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Suburban Office District
Light Industrial/Employment
Heavy Industrial
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Civic
Open Space
Existing Development
data source: WFRC ET+ Calibration, 2013;
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DAVIS
SALT LAKE
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MORGAN
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Farr West
North Ogden
Harrisville
Marriott-Slaterville
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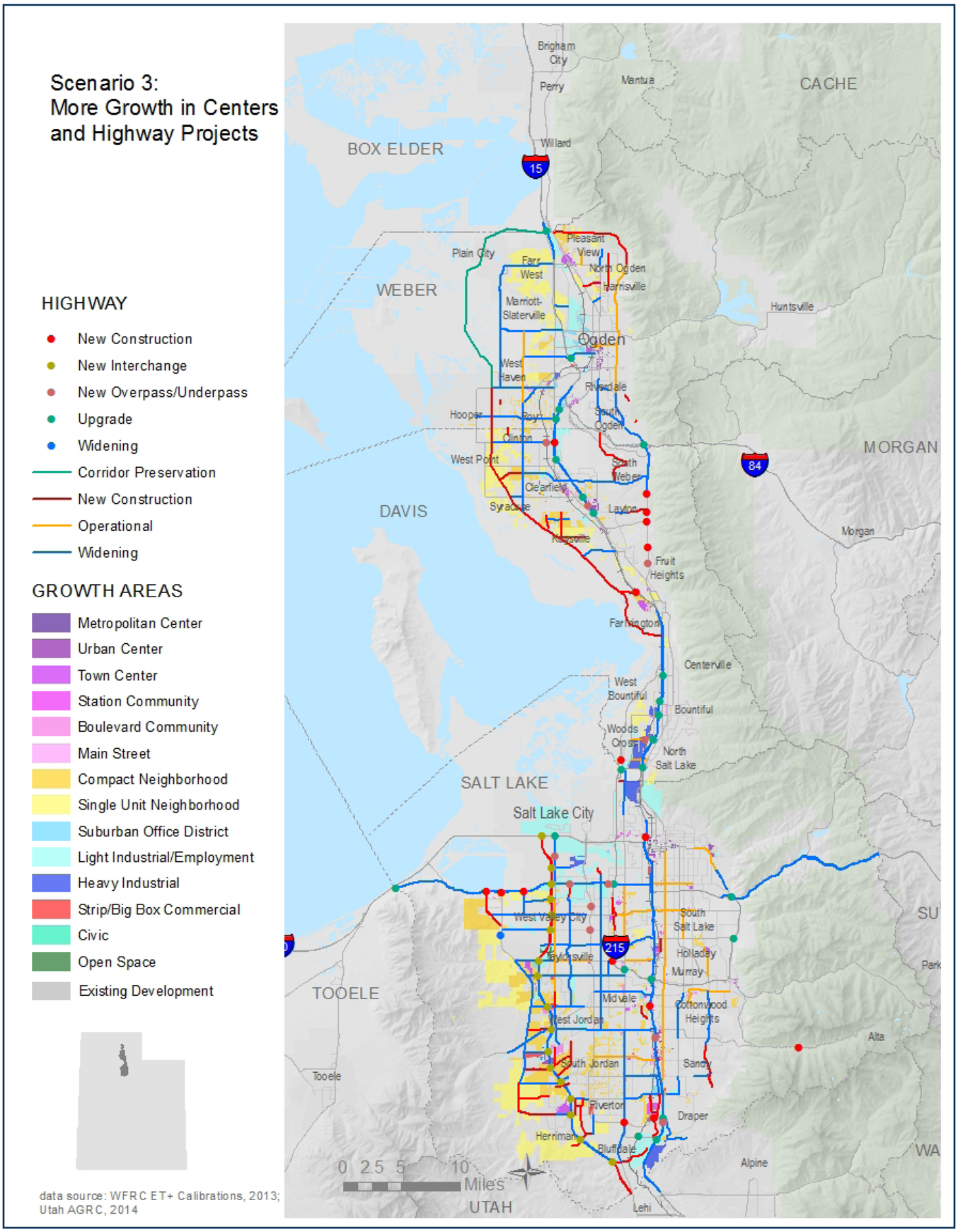
Ogden
West Haven
Riverdale
Hooper
Roy
South Ogden
Clinton
West Point
South Weber
Clearfield
Syracuse
Layton
Kaysville
Morgan
Fruit Heights
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
Salt Lake City
West Valley City
South Salt Lake
Taylorsville
Holladay
Murray
Midvale
Cottonwood Heights
West Jordan
Alta
South Jordan
Sandy
Tooele
Riverton
Draper
Herriman
Bluffdale
Alpine
15
84
215

MAP 4 - 5


Scenario 3:
More Growth in Centers and Highway Projects
HIGHWAY
New Construction
New Interchange
New Overpass/Underpass
Upgrade
Widening
Corridor Preservation
New Construction
Operational
Widening
GROWTH AREAS
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
Main Street
Compact Neighborhood
Single Unit Neighborhood
Suburban Office District
Light Industrial/Employment
Heavy Industrial
Strip/Big Box Commercial
Civic
Open Space
Existing Development
data source: WFRC ET+ Calibrations, 2013; Utah AGRC, 2014
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MORGAN
SU
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UTAH
Brigham City
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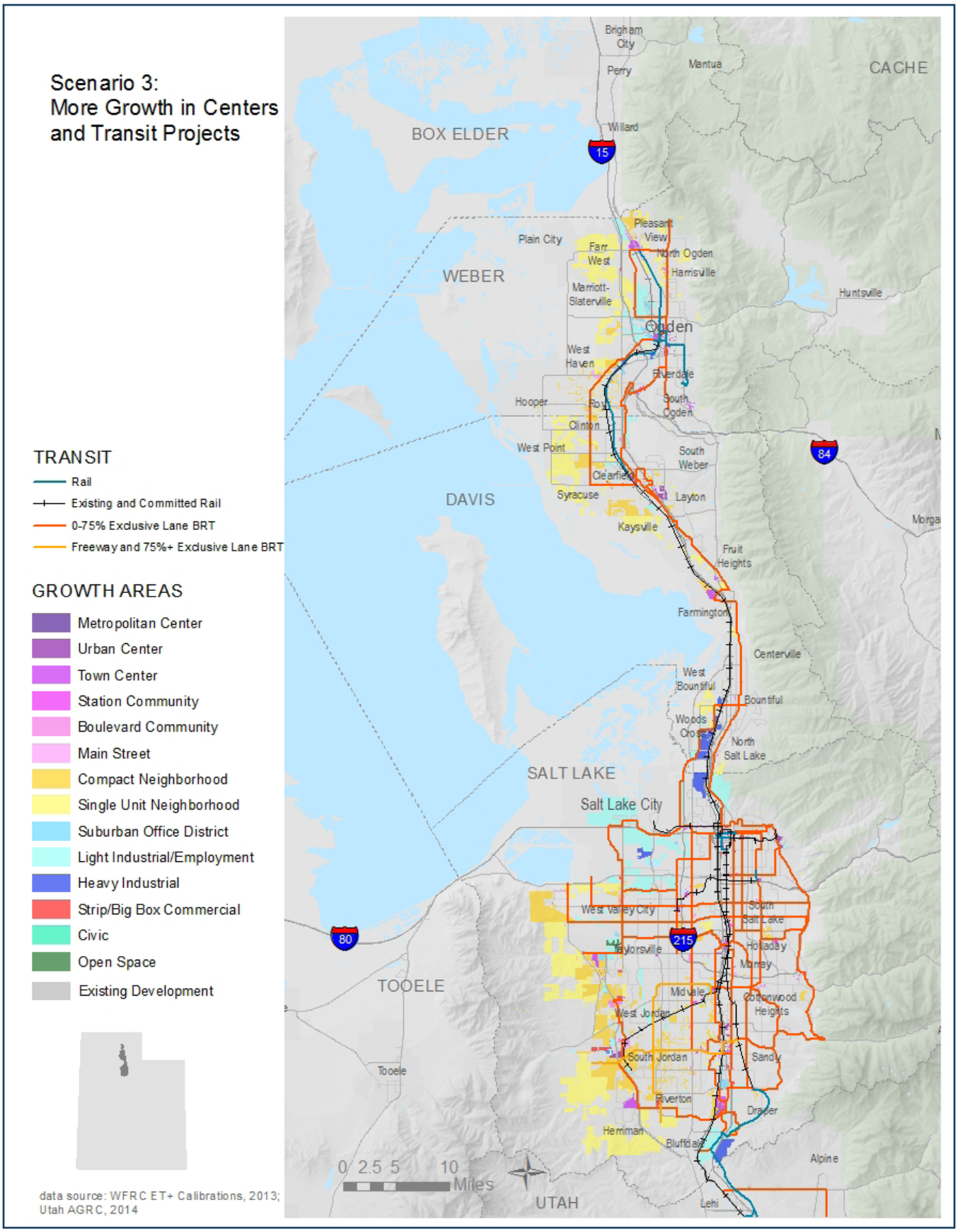
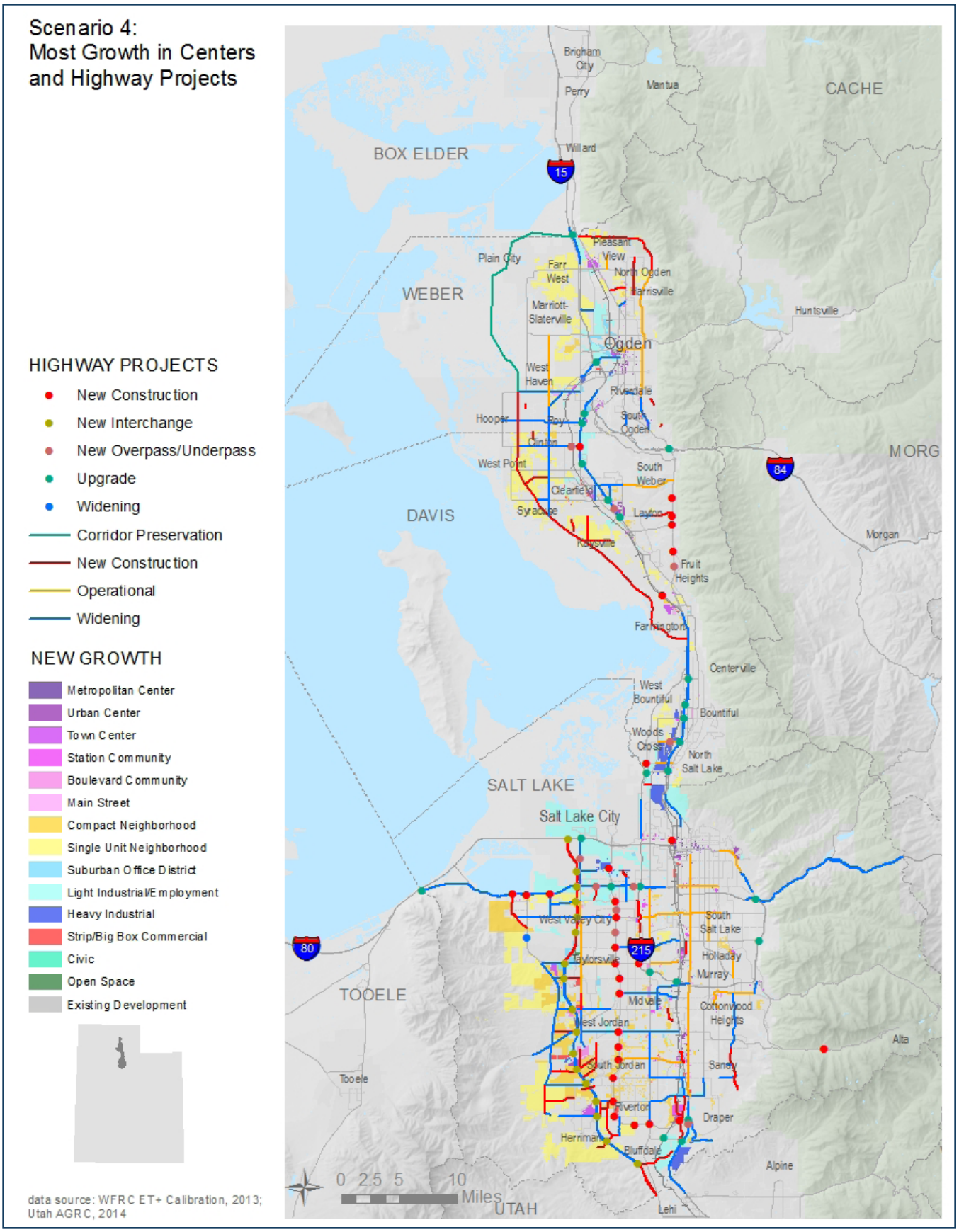
Cottonwood Heights
West Jordan
Alta
South Jordan
Sandy
Tooele
Riverton
Draper
Herriman
Bluffdale
Alpine
Lehi
Park
15
84
215
0 2.5 5 10
Miles

MAP 4 - 6


Scenario 3:
More Growth in Centers and Transit Projects
TRANSIT
Rail
Existing and Committed Rail
0-75% Exclusive Lane BRT
Freeway and 75%+ Exclusive Lane BRT
GROWTH AREAS
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
Main Street
Compact Neighborhood
Single Unit Neighborhood
Suburban Office District
Light Industrial/Employment
Heavy Industrial
Strip/Big Box Commercial
Civic
Open Space
Existing Development
data source: WFRC ET+ Calibrations, 2013; Utah AGRC, 2014
0 2.5 5 10 Miles
BOX ELDER
CACHE
WEBER
DAVIS
SALT LAKE
TOOELE
UTAH
Brigham City
Perry
Mantua
Willard
Plain City
Pleasant View
North Ogden
Harrisville
Farr West
Marriott-Slaterville
Ogden
Huntsville
West Haven
Riverdale
Hooper
Roy
South Ogden
Clinton
West Point
South Weber
Clearfield
Syracuse
Layton
Kaysville
Fruit Heights
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
Salt Lake City
West Valley City
South Salt Lake
Taylorsville
Holladay
Murray
Midvale
Cottonwood Heights
West Jordan
South Jordan
Sandy
Tooele
Riverton
Draper
Herriman
Bluffdale
Alpine
Lehi
15
84
80
215

MAP 4 - 7


Scenario 4:
Most Growth in Centers and Highway Projects
HIGHWAY PROJECTS
New Construction
New Interchange
New Overpass/Underpass
Upgrade
Widening
Corridor Preservation
New Construction
Operational
Widening
NEW GROWTH
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
Main Street
Compact Neighborhood
Single Unit Neighborhood
Suburban Office District
Light Industrial/Employment
Heavy Industrial
Strip/Big Box Commercial
Civic
Open Space
Existing Development
data source: WFRC ET+ Calibration, 2013; Utah AGRC, 2014
BOX ELDER
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SALT LAKE
TOOELE
MORG
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Brigham City
Perry
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Willard
Plain City
Farr West
Pleasant View
North Ogden
Harrisville
Marriott-Slaterville
Huntsville
Ogden
West Haven
Riverdale
Hooper
Roy
South Ogden
Clinton
West Point
South Weber
Clearfield
Syracuse
Layton
Kaysville
Fruit Heights
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
Salt Lake City
West Valley City
South Salt Lake
Taylorsville
Holladay
Murray
Midvale
Cottonwood Heights
West Jordan
Alta
South Jordan
Sandy
Tooele
Riverton
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Herriman
Bluffdale
Alpine
Lehi
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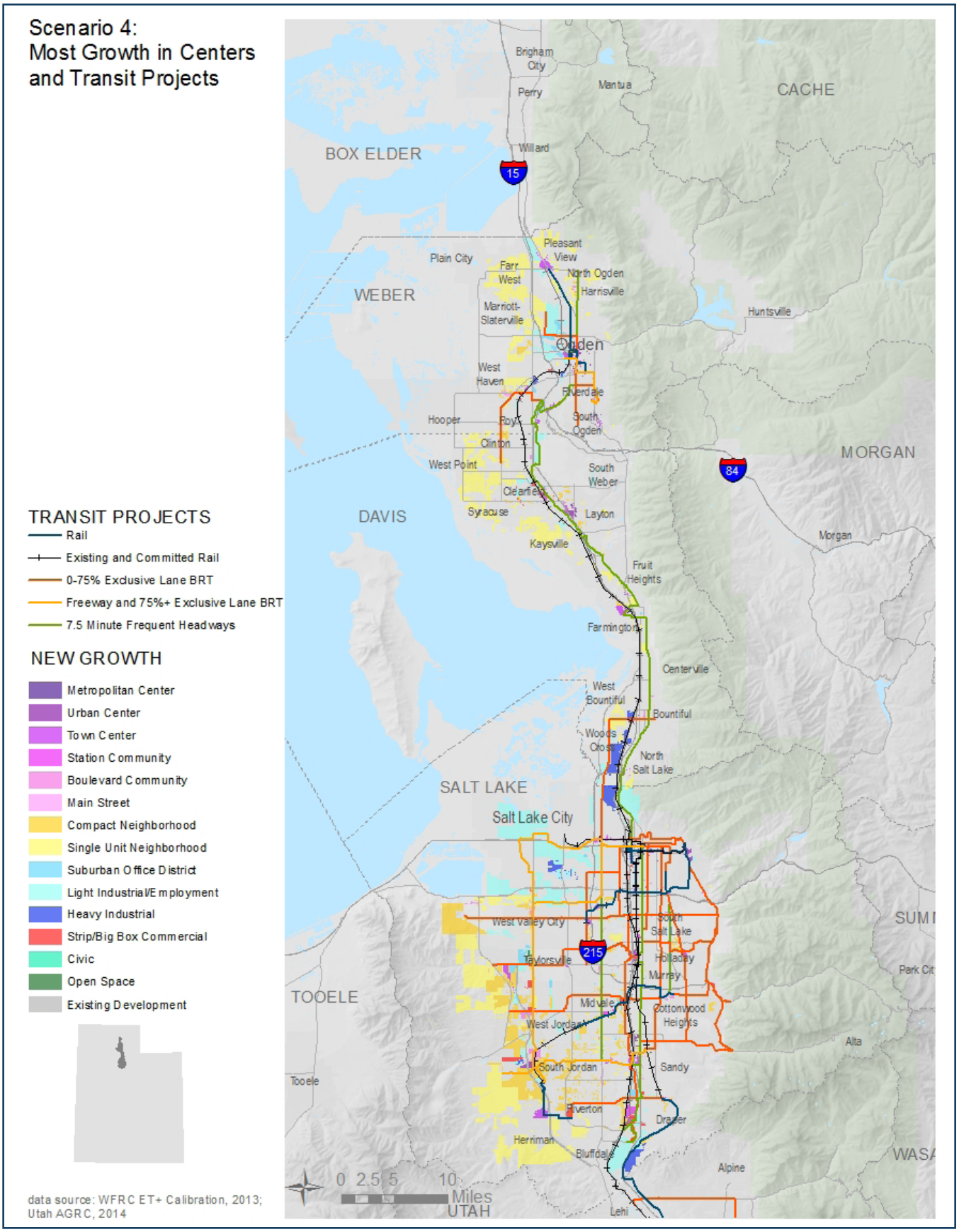
Miles

MAP 4 - 8


Scenario 4:
Most Growth in Centers and Transit Projects
TRANSIT PROJECTS
Rail
Existing and Committed Rail
0-75% Exclusive Lane BRT
Freeway and 75%+ Exclusive Lane BRT
7.5 Minute Frequent Headways
NEW GROWTH
Metropolitan Center
Urban Center
Town Center
Station Community
Boulevard Community
Main Street
Compact Neighborhood
Single Unit Neighborhood
Suburban Office District
Light Industrial/Employment
Heavy Industrial
Strip/Big Box Commercial
Civic
Open Space
Existing Development
data source: WFRC ET+ Calibration, 2013; Utah AGRC, 2014
0 2.5 5 10
Miles
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MORGAN
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Brigham City
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Willard
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Pleasant View
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Harrisville
Farr West
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Huntsville
Ogden
West Haven
Riverdale
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West Point
South Weber
Clearfield
Syracuse
Layton
Kaysville
Fruit Heights
Morgan
Farmington
Centerville
West Bountiful
Bountiful
Woods Cross
North Salt Lake
Salt Lake City
West Valley City
South Salt Lake
Taylorsville
Holladay
Murray
Midvale
Cottonwood Heights
West Jordan
South Jordan
Sandy
Tooele
Riverton
Draper
Herriman
Bluffdale
Alpine
Alta
Park City
Lehi
15
84
215

THE IMPORTANCE OF CENTERS

Centers are historical and emerging Regional destinations of economic activity and importance. The Wasatch Choice for 2040 Vision suggests that these centers should absorb some of the expected growth and expand to provide ever-broadening choices for resident to live, work, shop, and recreate. A mixture of other activities is also welcome. Center should work with the long term market, helping provide opportunities to residents who want to live close to work, walk or bike to shop, and have both great transit and road access, which is needed as our population ages, gas prices and congestion increase, and housing prices inch upward. The Wasatch Choice for 2040 Vision identified six different types and intensity of Regional centers which are described below.

Metropolitan Center

Downtown Salt Lake City is the metropolitan center, serving as the hub of business and cultural activity in the Region. It has the most intensive form of growth and expansion for both employment and housing, with high-rise development common in the central business district. It will continue to serve as the finance, commerce, government, retail, tourism, arts, and entertainment center for the Region. Building floor area ratios vary from 1 to 10 and the number of housing units range from 20 to 200 per acre.

Urban Center

Urban centers are the focus of commerce and local government services benefiting a market area of a few hundred thousand people. Urban centers are ideal areas to be served by high-capacity transit and major streets. They are characterized by two- to four-story employment and housing options. Building floor area ratios vary from .75 to 4 and the number of housing units range from 20 to 100 per acre.

Town Center

Town centers provided localized services to tens of thousands of people within a two- to three-mile radius. One- to three-story buildings for employment and housing are typical. Building floor area ratios vary from .5 to 1.5 and the number of housing units range from 10 to 50 per acre.

Station Community

Station communities are geographically small, high-intensity centers surrounding high-capacity transit stations. Station communities vary in their land use form and intensity, as some feature employment locations while others focus on housing. Many will include a variety of shops and services. Building floor area ratios vary from .5 to 2.5 and the number of housing units range from 20 to 100 per acre.

Main Street Community

Main streets are linear town centers. Each has a traditional commercial identity but on a community scale. Main street communities prioritize pedestrian-friendly features, but also benefit from good auto access and often transit. Building floor area ratios vary from .5 to 1.5 and the number of housing units range from 10 to 50 per acre.

Boulevard Community

A boulevard community is a linear center coupled with a transit route. Unlike a main street, a boulevard community may not necessarily have a commercial identity, but may vary among housing, employment, and retail along any given stretch. Building floor area ratios vary from .35 to 1 and the number of housing units range from 0 to 50 per acre.

A variety of centers will develop in the future that are similar to places in our Region today – place like downtown Salt Lake City, Provo, Ogden, and emerging downtowns like Sandy City. Centers can also be places like Station Park in Farmington, the Fireclay District in Murray, Cottonwood Corporate Center, and other similar concentration of housing and employment that are growing with market demand for living and working in accessible locations throughout the Wasatch Front.

In general terms, the different land uses represented in the scenarios can be described as variations on the Wasatch Choice for 2040 Vision. One of the more notable differences between the scenarios is the “centeredness” of the new growth. The term “centeredness” describes both how much of the forecasted new growth is anticipated to take place within identified areas of the Wasatch Choice for 2040 Vision and how much is allowed to take place in suburban locations throughout the Region. Two additional ways of understanding the differences among these four land use and transportation scenarios is (1) the amount of new growth allocated to infill and redevelopment areas and (2) the mix of new housing units.

Growth in Centers

"Centeredness" refers to the degree to which development is clustered within strong nodes of urban growth rather than being of a uniform density. Centering growth, as in historic downtown Ogden, emerging suburban downtowns like Sandy, main streets like Bountiful City's Main Street, or transit-oriented development like Murray's Fireclay District reduces the footprint of urban development and, by bringing some destinations closer together, lends itself to walking and bicycling. The Wasatch Choice for 2040 goes further to promote "centered growth" in strategic locations – coordinated with high-capacity public transportation and available in each part of the metropolitan area. Strategically located centers enable more people to easily use transit, and tend to reduce travel distances in general.

Infill and Redevelopment

Over time, it is generally expected that more growth will happen through infill in the Wasatch Front counties as urban development in the Region is becomes increasingly constrained by physical barriers, such as lakes and mountain ranges. The Wasatch Front will experience more infill and new development even as additional growth takes place in adjacent valleys at the same time, like the Tooele Valley, Morgan County, and Box Elder County. The question the scenarios explored is how much of the new growth might and should be infill and redevelopment and how much of it might and should spread to the adjacent valleys. Generally speaking the amount of infill and redevelopment correlates to the "centeredness" of each of the four land use scenarios.

Mix of New Housing

The housing mix also varies among the four scenarios. Today, two-thirds of our housing consists of relatively larger lot, single-family homes. As Regional planners consider future housing needs, they must be aware of anticipate changes in demographic groups. One of these changes will be the retirement of the large "baby boom" generation. In the coming years, most baby boomers will choose to downsize the size of their homes. We know that this will change the demand for housing across the Region, but planners are unsure exactly how this will affect future housing preference. Thus, the four scenarios explored a range of housing ideas, such as the possibility of 30 percent of new dwelling units being small lot, single-family, condominiums, and townhomes in Scenario 1. In contrast, Scenario 4 requires 60 percent of the homes to be small lot, single-family, condominiums, and townhomes. All four land use and transportation scenarios are plausible, given the significant demographic shifts anticipated in the metropolitan area.

Land Use And Transportation Network Connections
The type and degree of centeredness affects transportation in a variety of ways. Growth that takes place as infill and redevelopment is generally able to make better use of the Region's existing infrastructure than greenfield growth. Frequently the transportation system in these locations is sufficient to handle additional growth, especially in locations where the historical grid pattern of streets is still in existence, frequent transit service is already shown to be viable, and considerable highway and transit investments have been made.
The amount of growth that takes place in identified Wasatch Choice for 2040 centers, both in the Region's core and in its more suburban areas, have reduced negative impacts on the Wasatch Front's transportation system than new growth outside of these centers.
They help residents and employees access public transportation without an auto. Centers typically feature a mix of uses, walkable design, and thereby encourage more bike, pedestrian, and transit trips that result in fewer auto trips. With a complementary mix of uses, they have the potential to bring together popular destinations within an easy walk. They also promote combining trips and facilitate transit use as daily travel needs are simplified. With walkable street design centers provide safe and inviting streets that further enhance the viability and desirability of walking and bicycling trips. Wasatch Choice for 2040-designatedcenters should be considered as appropriate locations for enhanced transportation planning efforts such as a well-connected local streets (like a historic grid), appropriate access to major highway and transit facilities, and attractive and safe walk and bicycle facilities.

Both infill and redevelopment within Wasatch Choice for 2040 centers help reduce the demand for urban expansion into suburbia which, in turn, reduces new local and regional infrastructure. These expenses typically outpace the construction costs and ongoing tax revenues from greenfield developments.

DEVELOPMENT OF A PREFERRED SCENARIO

The preferred scenario identifies the regional transportation projects needed in the Wasatch Front Region between now and 2040 and represents a hybrid, or combination of the four scenarios that were developed

to explore different land use and transportation alternatives. Each of the four scenarios used the same population projections, the same number of jobs, and roughly the same amount of funding for future transportation improvements, varying only in the type and intensity of future growth assigned to Wasatch Choice 2040 centers. The draft preferred scenario is not fiscally constrained, nor are specific highway and transit projects assigned a construction phase. The final scenario, which was used as the basic for the Wasatch Front's 2015 – 2040 Regional Transportation Plan and evolved from a development process described below.

The first step in the preferred scenario process was to determine four possible future land use patterns based on the Wasatch Choice 2040 Vision. The first round of meetings in 2013 provided general direction on how to plan the transportation system. The WFRC staff discussed the general direction on how to plan the Region's transportation system, offering four possible growth and development scenarios to local governments, communities, and key partners regarding how and where transportation and corresponding development might take place. A series of small area outreach and one-on-one meetings, held in June of 2013 with municipal administrators, engineers, and planners, provided important input and direction on each community's anticipated land use and specific transportation needs. The WFRC staff also presented, discussed, and received critical feedback on the four possible growth and development scenarios from key planning partners, such as FHWA, UDOT, UTA, and other stakeholders.

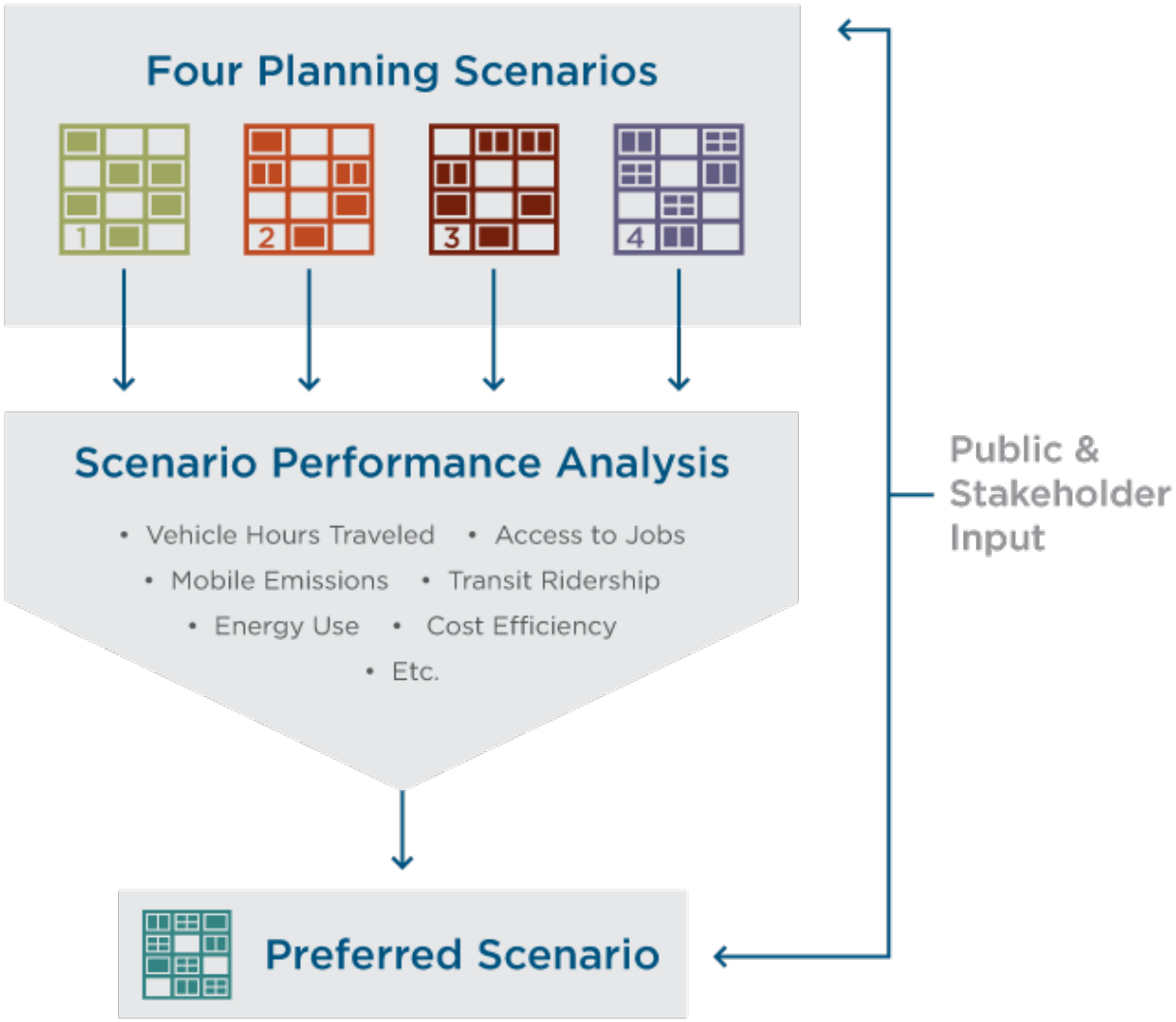
At these meetings, solicitation of input focused on how and where future highway and transit improvements would work together with anticipated corresponding development – both with an eye toward regional market demand and quality of life impacts. Using the Envision Tomorrow Plus (ET+) analysis tool, a scenario planning model that allows users to allocate different land uses across the Region. Each of the four land use scenarios was modeled and a number of variables were evaluated. ET+ outputs were then added to base year data to for the official socioeconomic forecasts and comments were incorporated into the development of the preferred scenario.

Next, the WFRC modeling staff ran the four land use scenarios through the travel demand model and outputs, such as volume over capacity, access to Wasatch Choice 2040 centers, environmental impacts, transit ridership, freight mobility, and other concerns, were analyzed and evaluated. Based on modeling outputs and numerous comments from the small area meetings, the WFRC staff prepared a new growth and transportation scenario known as the draft preferred scenario. The preferred scenario's land use pattern and transportation networks were a compilation of the best ideas of the four scenarios and not one of the four. In other words, the preferred scenario was a hybrid of the four alternatives that examined different levels of growth within identified Wasatch Choice 2040 centers and the transportation connections to serve such.

A second series of small area outreach meetings, held in January and February of 2014 highlighted the draft preferred scenario. Communities, stakeholders, the general public and transportation partners reviewed the draft preferred scenario and the WFRC staff refined it based on that input. After finalizing the preferred scenario, which was adopted by the Regional Council in May 2014, the WFRC identified financial constraints based on anticipated funding, and prioritized projects into phases. This phased, financially constrained preferred scenario became the basis for the 2015 – 2040 Regional Transportation Plan and is discussed in more detail in the next sections.

Scenario Development Process

The land use pattern in each of the four scenarios is a representation of the. The land use pattern for each of the four scenarios were developed using the Envision Tomorrow Plus (ET+) analysis tool. ET+ is a scenario planning tool that allows the user to distribute a variety of development types parcel by parcel across the region and evaluate a variety of outputs across scenarios. Model outputs include water and energy consumption, infrastructure needs, and tax revenues. The attributes of each the scenarios' land use patterns including housing units, commercial and retail space, public facilities, and center intensity. Each scenario land use pattern was carefully reviewed by the cities and counties as part of the June 2013 series of small area meetings. Comments from these local officials and technicians were incorporated into the final land use scenario and socioeconomic forecasts. As anticipated by the WFRC staff planners, the preferred scenario was a combination of the best of the four scenarios, not one of the four.



Scenario Roadway Network Development

The WRFC staff ran the four land use scenarios through the regional transportation demand model. The staff examined a variety of model outputs, such as volume and congestion, along with considerations for the Wasatch Choice for 2040 centers, wetlands, freight, and other sensitive or "special needs" areas and developed project lists, which were then run through the model. For example, some facilities had high congestion, but passed through centers that are planned to be more walkable and well served by transit, so staff planners didn't recommend widening. The WFRC staff also added some projects that were plausible, but maybe not likely, so that each of the four scenarios could stretch people's ideas of what was possible and create more differentiation and distinction between the four scenarios. One example of a plausible project would be a freeway near 6200 South on the west side of Salt Lake County. Staff planners and engineers also considered past stakeholder input and previous regional transportation plans. At least two modeling iterations, and sometimes three or four, were performed for each of the four scenarios.

Scenario Transit Network Development

The transit networks for each of the four scenarios were developed using a multi-step process. The steps were as follows:

1. Develop a long list of potential transit corridors;
2. Package the long list of corridors into a network for each scenario;
3. Forecast the relative ridership potential of each corridors; and,
4. Assign transit modes and project extents of each corridor.

The list of potential transit corridors was developed with UTA staff input from a long list of potential projects.

This list of projects were derived from the 2011-2040 RTP, from studies completed in the four years since the 2011-2040 RTP was completed, suggestions from stakeholders, and a high level review of potential transit corridors in each of the scenarios. Each potential project was reviewed for its relationship to several measures of success, including proximity to scenario activity centers, existing transit markets, system connectivity, and current corridor ridership. Those projects that meet a specific transit need, with substantial stakeholder interest or a reasonable possibility of success, were kept in the list of corridors.

The list of potential transit corridors were then packaged into four initial corridor networks, which were designed to best fit the land use and highway networks of each of the respective scenarios. All projects, unless dictated by the physical make-up of the corridor, were tested as Bus Rapid Transit without any local bus in the background in order to best ascertain the relative transit corridor markets. The Regional travel demand model was then used to estimate the 2040 ridership potential of each segment of each corridor. Each of the four transit corridor networks were modeled on each of the land use and roadway scenarios. Efforts were employed to minimize the potential of screening a good project out of the final analysis, based upon variations in the land use or highway elements of a particular scenario.

Finally, the resulting ridership forecasts along with high level finance caps, input from UTA and UDOT staff, and from the municipalities was used to create the final transit network for each of the four scenarios. All transit projects included a placeholder alignment, end points, and technology. Each technology was assumed to have uniform characteristics, such as station spacing, that are tied to cost. The combined land use alternatives, roadway networks, and transit networks comprised each scenario. The population, employment, and transportation construction costs were held constant among the four scenarios in order to facilitate a comparative assessment.

Scenario Modeling and Analysis

Each of the four scenarios, their networks and their individual projects, were assessed for project selection as part of the draft preferred scenario. Among the tools that were used to complete this assessment was a system-wide report card comparing each of the four scenarios. The report card compared each of the four alternatives, the draft preferred scenario, and current conditions using a variety of important performance measures. The performance measures were carefully chosen to give decision-makers the opportunity to compare how well each scenario supports the WFRC's adopted goals. The bar charts on the following pages, **Figures 4-1 through 4-11**, represent select performance measures used in the analysis of the four scenarios. Information relevant to the interpretation of these charts is as follows:

- The primary target goal of the measure is provided in the upper left corner. A brief description of the measure is included under each graph.
- The orange graph bars indicate that higher measures are better and blue graph bars which indicate that lower measures are better.
- On some bar graphs, the "Current" scenario bar represents 2016 conditions, whereas the remainder of the scenarios represents 2040 conditions.
- The "Draft Preferred Scenario" in some of the charts represents the draft preferred scenario as of January 2014. Potentially significant changes to both the transportation and urban form elements of the scenario have occurred since then.

The factors influencing destination accessibility are (1) the proximity of households and employment or education opportunities in relationship to each other, (2) the speed of movement through transportation facilities, and (3) the placement of these facilities to serve the job and higher education commutes. The draft preferred alternative did not significantly increase the average distance traveled or the average travel time by car, indicating that the significant increase in accessibility by auto and by transit was due to the placement of the projects in a way that better serves the job and higher education commute.

Transit use and travel time by car are both representative measures of mobility. Transit use varies somewhat among the four scenarios and all the alternatives are substantial improvements over current transit market share. This may reflect both increases in transit service and higher concentrations of activity along established transit lines.

Average travel time by car gradually improves (is reduced) in each of the four scenarios, with the draft preferred scenario performing the best. However, all of the scenarios have significantly longer average travel times for autos as compared with the current year. The average distance traveled by auto per household climbs by about the same amount as the travel time, indicating that longer trips rather than increased delay may be the cause.

Several of the evaluated performance measures such as destination accessibility, travel time, and air quality (mobile emissions) relate to economic vitality. In addition,

FIGURE 4 - 1 ACCESSIBILITY – WORK AND COLLEGE BY CAR

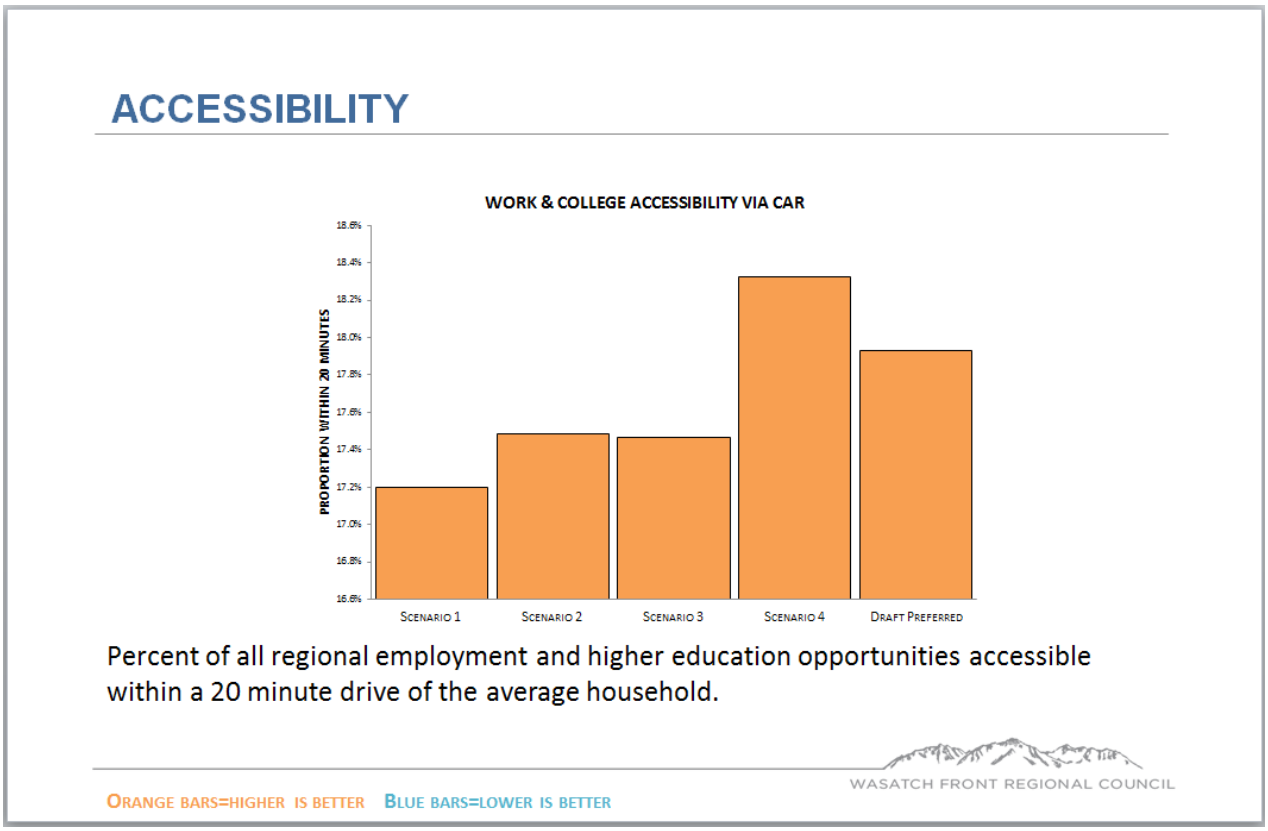


FIGURE 4 - 2 ACCESSIBILITY – WORK AND COLLEGE BY TRANSIT

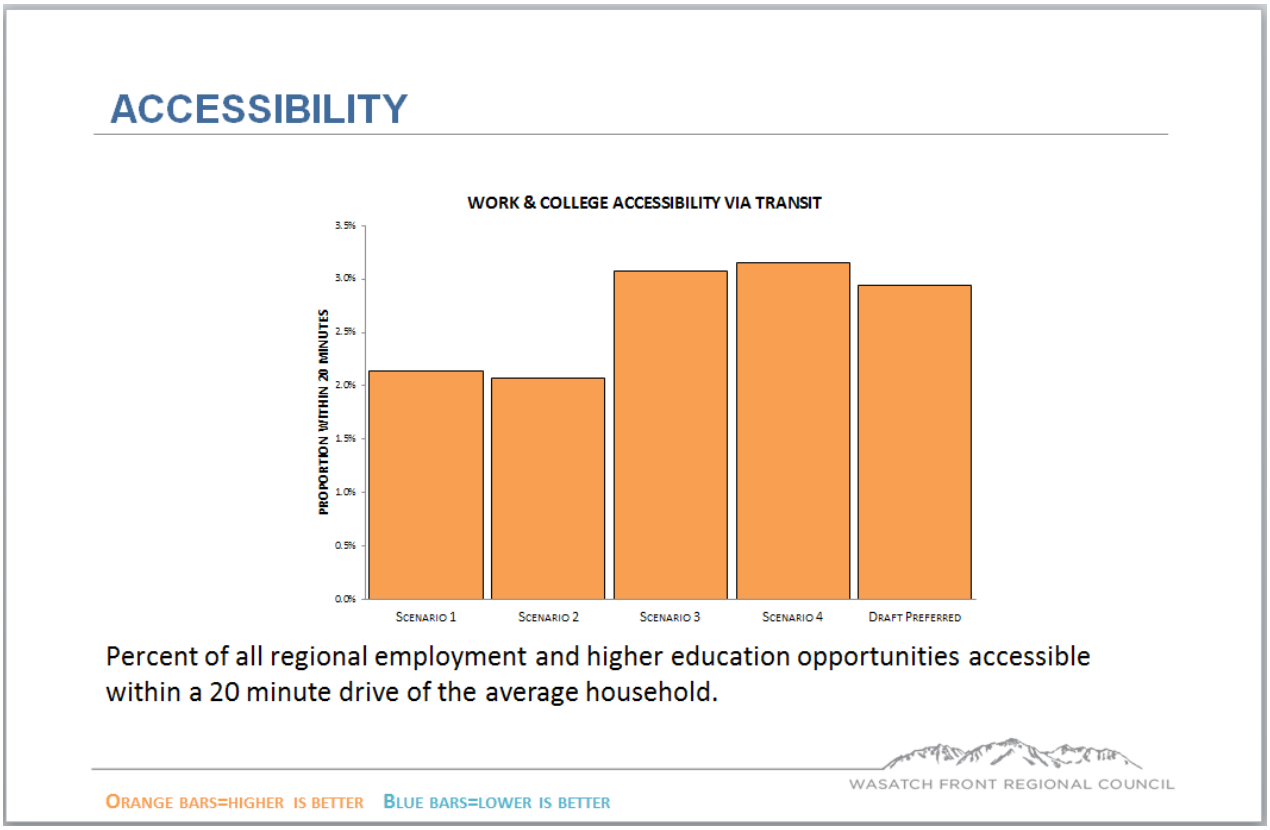


FIGURE 4 - 3 MOBILITY – TRANSIT USE

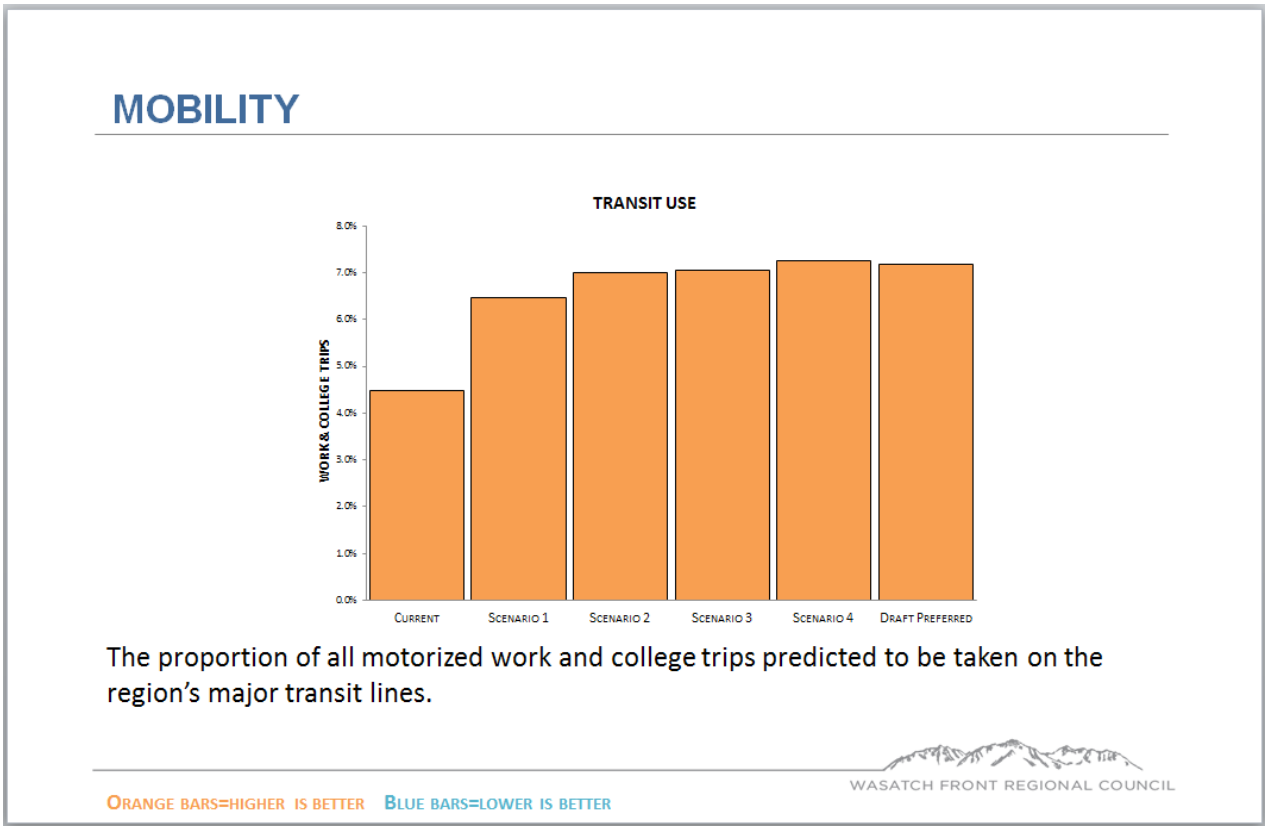


FIGURE 4 - 4 TRAVEL – TRAVEL TIME BY CAR

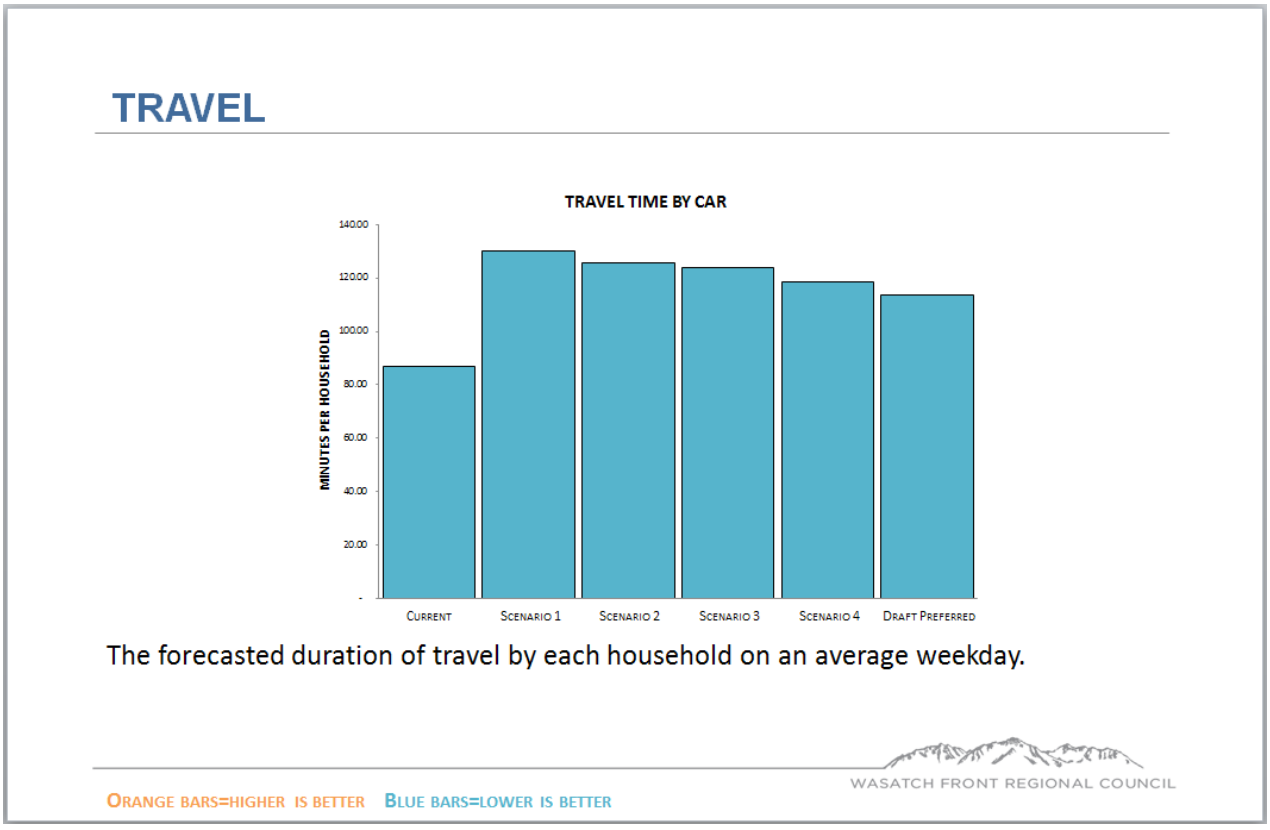


FIGURE 4 - 5 ECONOMIC VITALITY – TRUCK FREIGHT TRAVEL TIME

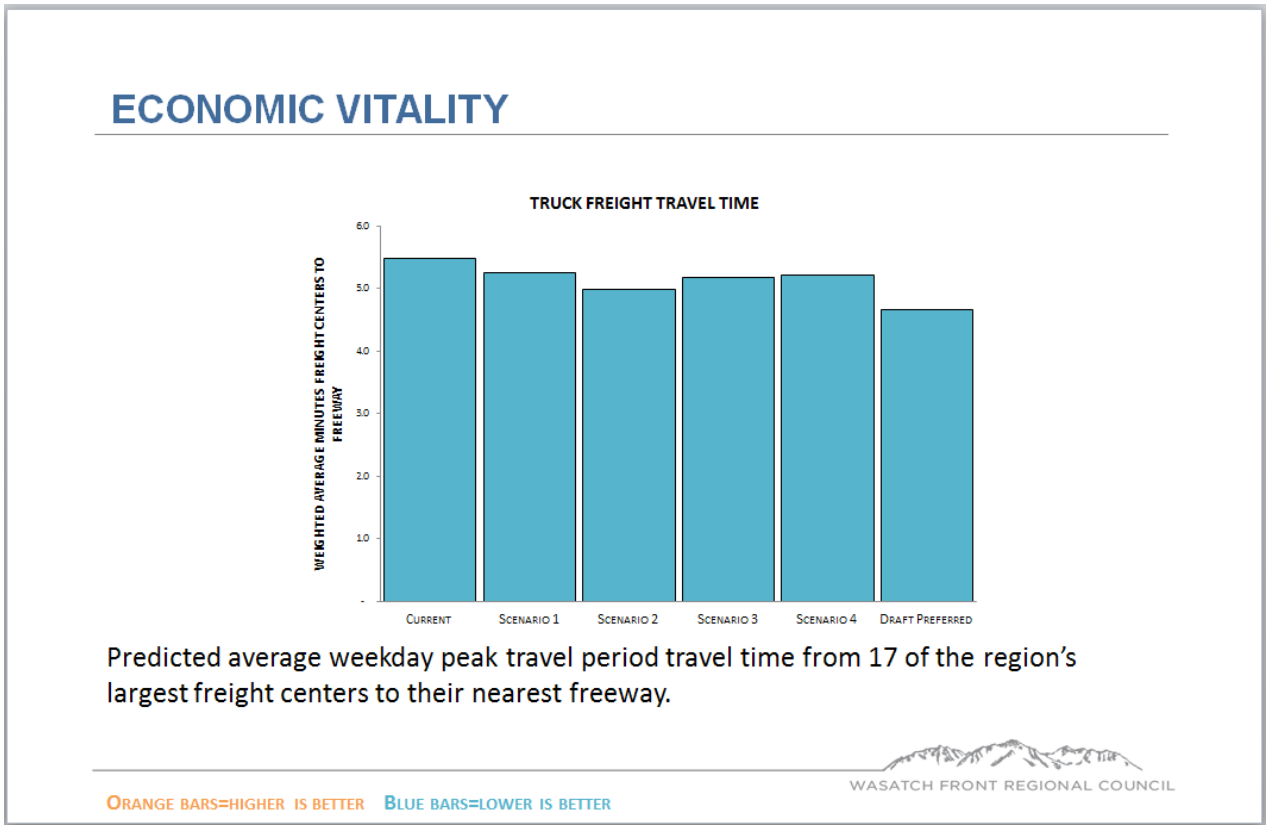


FIGURE 4 - 6 COST EFFICIENCY – MAJOR ROAD CONSTRUCTION

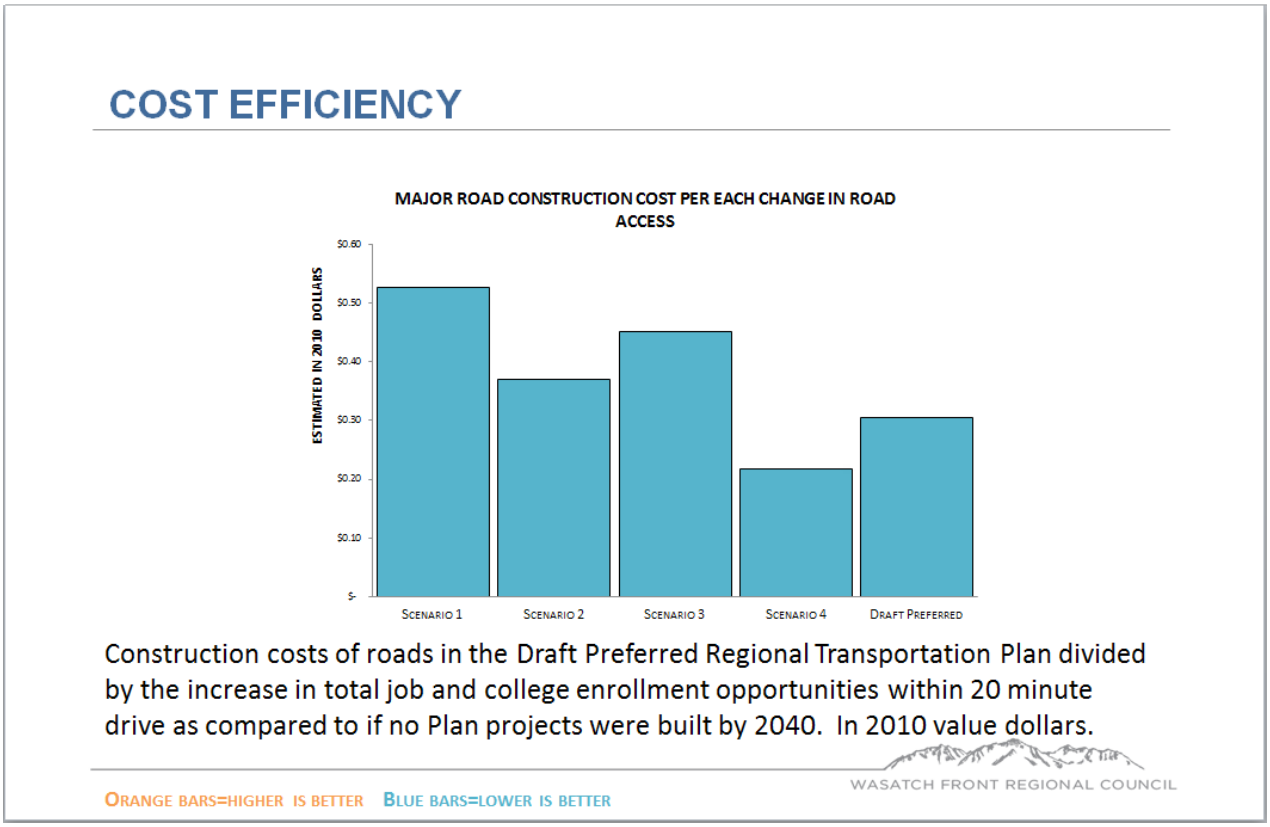


FIGURE 4 - 7 COST EFFICIENCY – MAJOR TRANSIT CONSTRUCTION

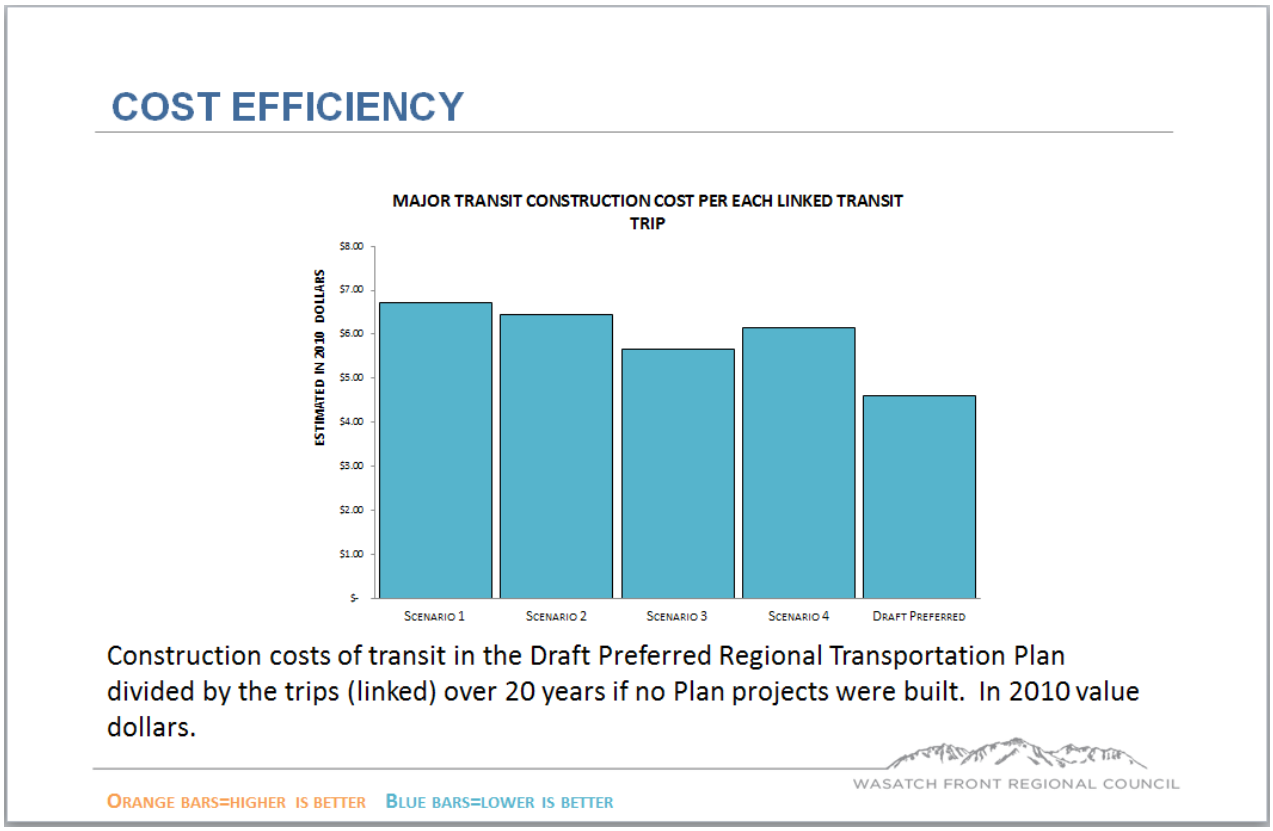


FIGURE 4 - 8 HEALTH AND SAFETY – MOBILE EMISSIONS

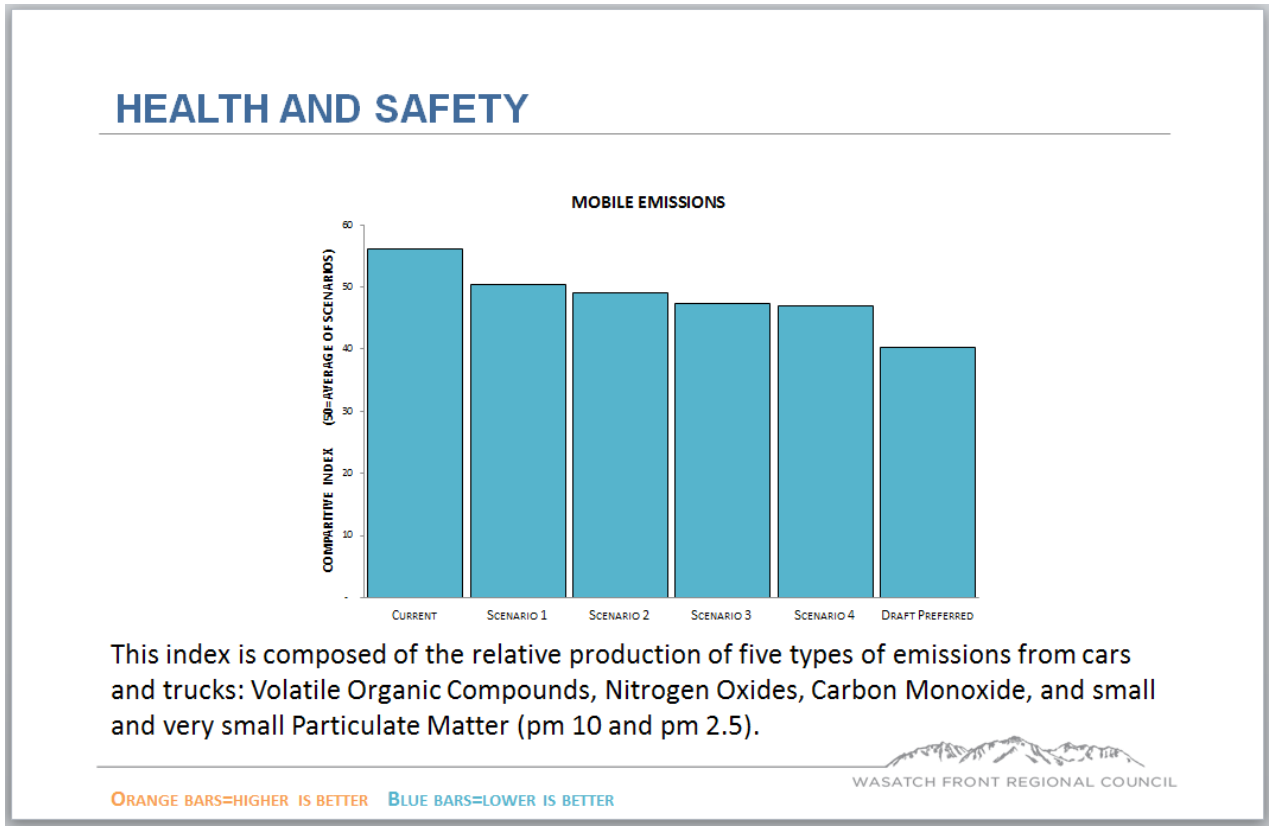


FIGURE 4 - 9 ENVIRONMENT – ENERGY USE

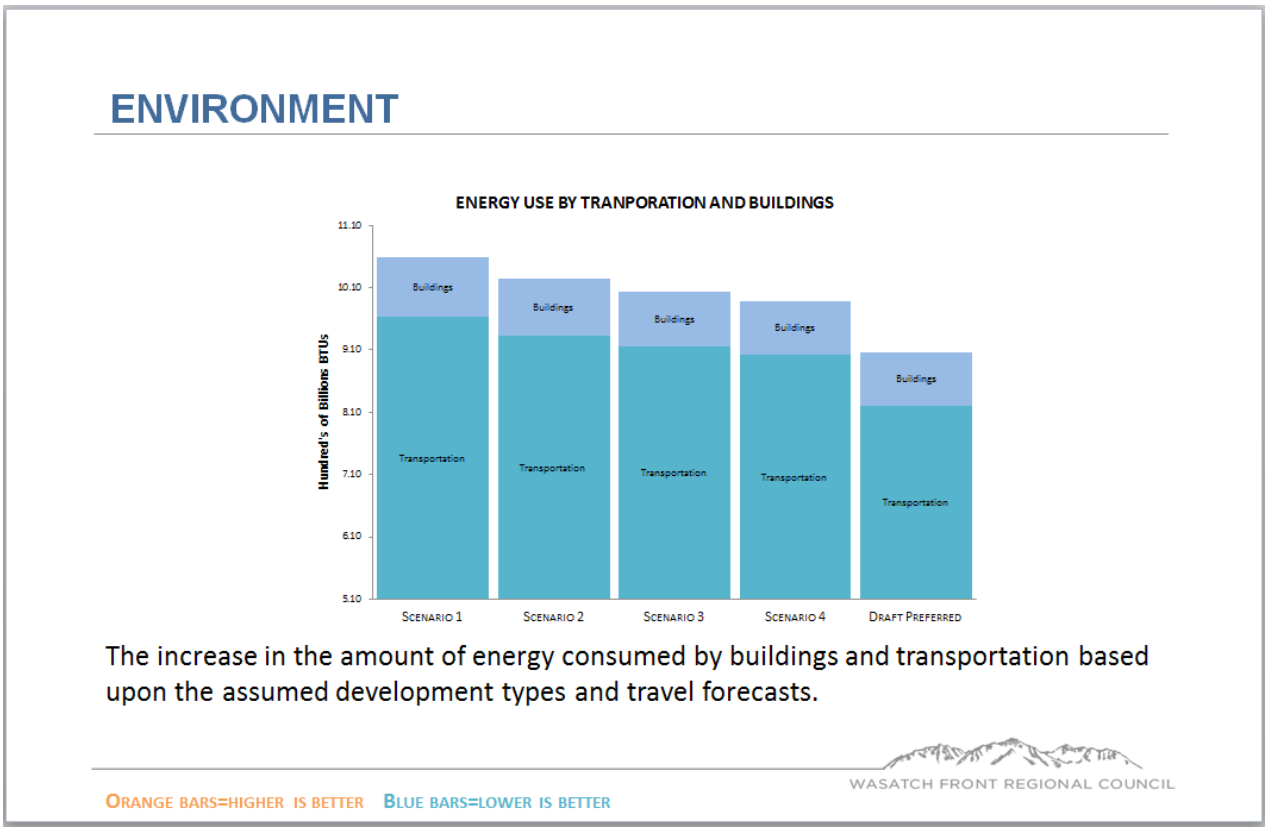


FIGURE 4 - 10 ENVIRONMENT – INDIRECT NATURAL RESOURCE IMPACTS

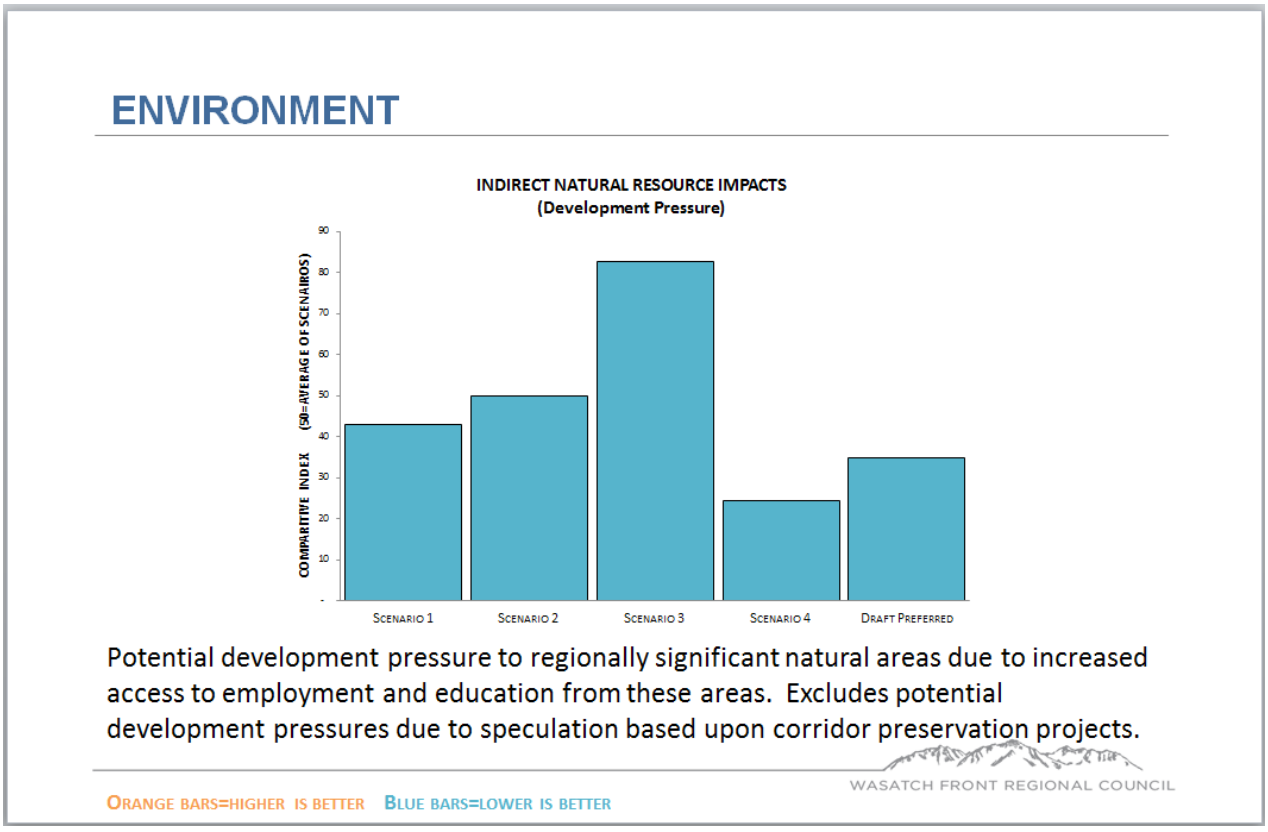
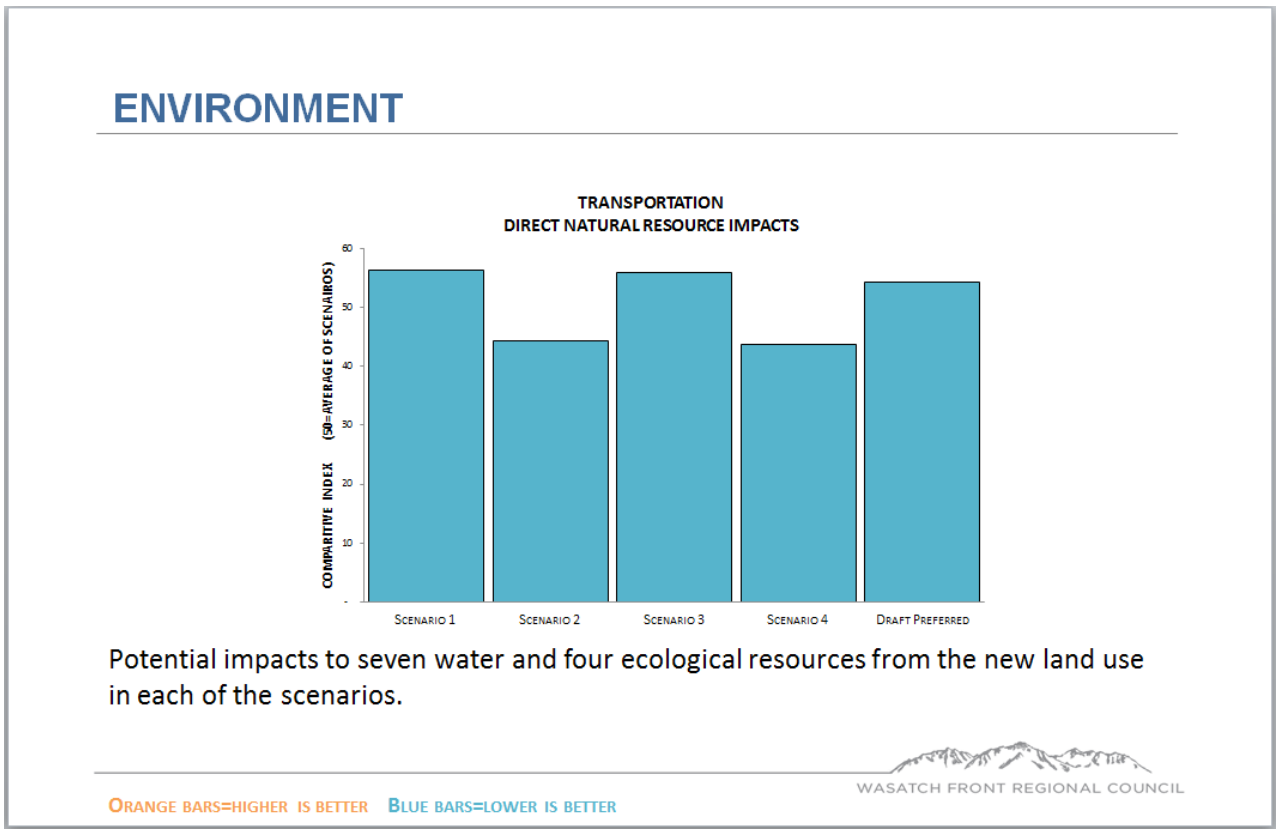


FIGURE 4 - 11 ENVIRONMENT – DIRECT NATURAL RESOURCE IMPACTS



one of the most direct measures is truck freight travel times from seventeen of the Regions' largest freight centers to nearby freeways. The draft preferred scenario significantly decreases the total travel time to local freeway because these routes were specifically targeted for improvements when warranted by delay. The WFRC staff will continue to monitor these routes and seek to keep them uncongested in an effort to improve our Region's economic vitality.

Cost efficiency is a key measure for the 2015 – 2040 RTP. Transportation needs are substantial and on-going and the ability to meet transportation needs will always be limited by available and projected funds. All of these measures help the WFRC staff prioritize investments. Cost efficiency is a summary measure of how effective the RTP is meeting our objectives. Two key objectives are providing (1) timely transportation access to employment centers and higher education opportunities and (2) transit ridership. Therefore, cost efficiency includes destination access by auto and transit ridership as the numerators (the benefit side of the equation) for these performance measures. Other objectives were also assessed on a cost basis. Although not discussed here, these correlate to destination accessibility and transit ridership. In general, the draft preferred scenario is generally more cost effective than the other four scenarios, with the exception of Scenario 4, which has the most centered land use. More centered land use helps improve cost efficiency by making use of the existing transportation system and limiting the need for new, low-use facilities on the urban fringe.

Foremost among causes of auto emissions in the Region is the number of auto trips taken regardless of length traveled. The beginning of a trip, when the cars' catalytic converter is not warmed up and functioning, is called a cold start. As much as 80 percent of a trip's emissions can take place in the first few miles after a cold start. Other, causes of travel emissions include idling, the number of vehicle miles traveled, travel speed, and stop-and-go driving (acceleration). Speed and VMT effects are captured by the regional travel and air quality models and are reflected in the emissions and energy use bar graph above. The draft preferred scenario provides significant improvements in energy use and modeled travel-related emissions. Although not forecastable, attention was paid to limiting the potential for cold starts when developing the 2015 – 2040 RTP. For example, transit close to origins and destinations is far preferable to transit that requires even a short park-and-ride trip.

Transportation projects can directly impact natural resources such as wetlands and habitat for endangered species. Transportation projects can also indirectly impact these resources by increasing the access to, and

therefore the development pressure upon, the sites of these resources if they are not otherwise protected. The WFRC staff assessed both direct and indirect impacts of transportation projects to the Regions' significant natural resource areas.

The direct impacts were estimated using a computer mapping of identified natural resources and the preliminary project locations. Direct impacts can frequently be reduced based upon specific project locations. Major projects, especially those that might potentially impact natural resources, undergo extensive environmental impact analyses to determine if the impacts can be reduced or even eliminated at that time of construction. The indirect impacts of each of the transportation scenarios were estimated by first identifying the major unprotected, natural resource areas in the Region, using computer mapping, and then by using the travel demand model to assess the increase in access to, and therefore the development pressure upon, these resource areas.

The draft preferred scenario fell within the middle of the four scenarios in terms of direct and indirect natural resource impacts. Additional work was done after the January 2014 version of the draft preferred scenario to identify which projects were impacting these regionally significant natural resource areas and consider modifying those projects to decrease their direct impacts. The chapter titled Plan Impacts and Benefits, discusses the natural resource impacts of the 2015 – 2040 RTP.

Description of Envision Tomorrow Plus

Envision Tomorrow Plus (ET+) is a scenario planning tool that allows the user to "paint" a variety of development types and compare a variety of metrics across scenarios. Metrics include water and energy consumption, infrastructure needs, and tax revenues. WFRC used ET+ to paint four regional scenarios.

Description of TDM

The WFRC maintains a travel demand model (TDM) which forecasts travel demand. The user can directly input different socio-economic assumptions, along with corresponding land use types, allowing for a variety of highway and transit alternatives to be tested. The socio-economic assumptions which were used to model the four 2015 – 2040 RTP scenarios were derived from the ET+ scenarios. The transportation networks used in the model were developed from the scenario planning process, which iterated between the impacts that the transportation system and land use patterns had on each other. The TDM is updated and recalibrated every four years. Each update results in a new version of the model. Version 7 was used for the scenario planning process. A beta version of Version 8 was used for analyzing the phasing of the plan and for subsequent RTP-related modeling, so there may be some inconsistencies when comparing metrics from the final plan to the scenarios. All of the TDM related metrics included in this section were derived using Version 7 of the model.

Congestion Management

The congestion management process (CMP) identified capacity increasing projects necessary to meet future traffic demand in cases where system management and demand management strategies alone are inadequate. Projects identified as potential capacity increasing projects by the CMP were included in at least one of the

TABLE 4 - 1 SCENARIO PREFERENCE RESULTS

COUNTY	WHICH SCENARIO IS LIKELY TO BE BUILT?	WHICH SCENARIO IS PREFERRED?	COMPOSITE (1/3RD FROM THE "LIKELY RESPONSES, 2/3RDS FROM THE "PREFERRED RESPONSE)
Weber	2.1	3.0	2.7
Davis	2.1	2.8	2.6
Salt Lake	2.6	3.4	3.1

four scenarios. After evaluating the various alternatives, a preferred alternative was recommended. A review of the preferred alternative was made to assure that only capacity increasing projects identified through the CMP were included in the preferred scenario.

PUBLIC INVOLVEMENT

The leaders and staff members of the Wasatch Front Regional Council engaged in a proactive public outreach and education program for the Regional visioning effort in preparation for the update to the 2015 – 2040 RTP. This outreach effort included multiple e-mails to stakeholders detailing the four alternative growth scenarios described above and inviting their comment, a formal public comment period, three well-advertised public open houses, and eleven meetings for city and county leaders to comment on the scenarios. Over this process, which lasted several months, hundreds of comments were received and catalogued. These comments were then carefully considered by the WFRC planning staff in preparation for development of the projects within the 2015 – 2040 RTP and responded to individually.

Worthy of additional discussion in this review were the eleven small area meetings for city and county leaders, planners, and engineers. Significant effort was made to ensure that each city was represented at their respective meetings. The four alternative growth and transportation scenarios were then explained in detail and an electronic poll was taken asking two questions: (1) which scenario is most likely to actually be built given present trends and (2) which scenario is most desirable for your local community? The results of the poll are reflected in the comment summary **Table 4-1**.

As noted in the above table, results from county to county in terms of anticipated development and desired development were remarkably similar. The more densely populated areas of Salt Lake County showed a slight preference for more intense development than the rural areas of western Weber County for example. However, the survey results do indicate a relative homogenization of attitudes and expectations for development across the Region.

At the end of the small area meetings, the attendees were invited up to the four scenario maps and requested to write directly on the maps any changes they felt were needed. The maps were marked with recommended changes from the city and county leaders. Comments, such as there should be more or less density in a particular development, the growth boundaries should be shifted in some manner, and the type of development should be different for this particular area, were noted. Again, these comments were carefully gathered and reviewed by the WFRC staff prior to settling on a preferred growth scenario. The comments did have a dramatic effect in numerous instances as to the type and location of growth recommended in the preferred scenario. Even though these scenarios and associated meetings and comment periods were designed to elicit public engagement on growth issues affecting the Wasatch Front, there were numerous comments received on specific highway, transit, and active transportation projects. These comments, along with those received on the four growth scenarios, were carefully catalogued and reviewed by the WFRC staff and shared with the Regional Council.

Meeting Comment Summary

During the month of June, the WFRC staff held a series of eleven meetings for representatives from all city and county jurisdictions within the Region regarding four proposed growth and development scenarios. These representatives included county commissioners, city mayors, city and county planners, and engineers. The four scenarios were presented to the meeting attendees who then commented on and made recommendations on the same. The meetings were generally well attended and most cities and all counties had representatives at the meetings. Most comments were specific to the respective cities or counties and would be difficult to summarize. Nevertheless, some general observations and the results of a poll conducted at the meetings are noted below.

- There is an understanding that in some built out areas the only way to grow is up.
- Urban renewal is becoming a concern.
- New growth pays for new projects, not the rehabilitation of existing areas.
- Housing preferences among millennials and retirees are shifting toward multi-unit housing.
- There has been a shift in attitudes toward higher density housing in the more urbanized areas, less so in the outlying areas.
- There is a lack of multi-family housing, especially for seniors.
- There is a demand for housing between starter housing and higher end single family homes.
- There is a strong desire for active transportation as an element of the overall transportation plan.
- Maintaining what we have is becoming a problem.
- The more rural areas want to remain rural.
- There comes a point where it is difficult to widen the roads anymore and transit must carry a larger

portion of travel demand.

- Roads will continue to carry the heavy majority of trips and cannot be ignored.
- Telecommuting is more prevalent now.
- We need to get a more regional view of the bicycle system, especially along the canals.
- There are some key safety issues for bicycles that need to be addressed to help usage.
- The real problem is east / west travel and how to meet that demand.